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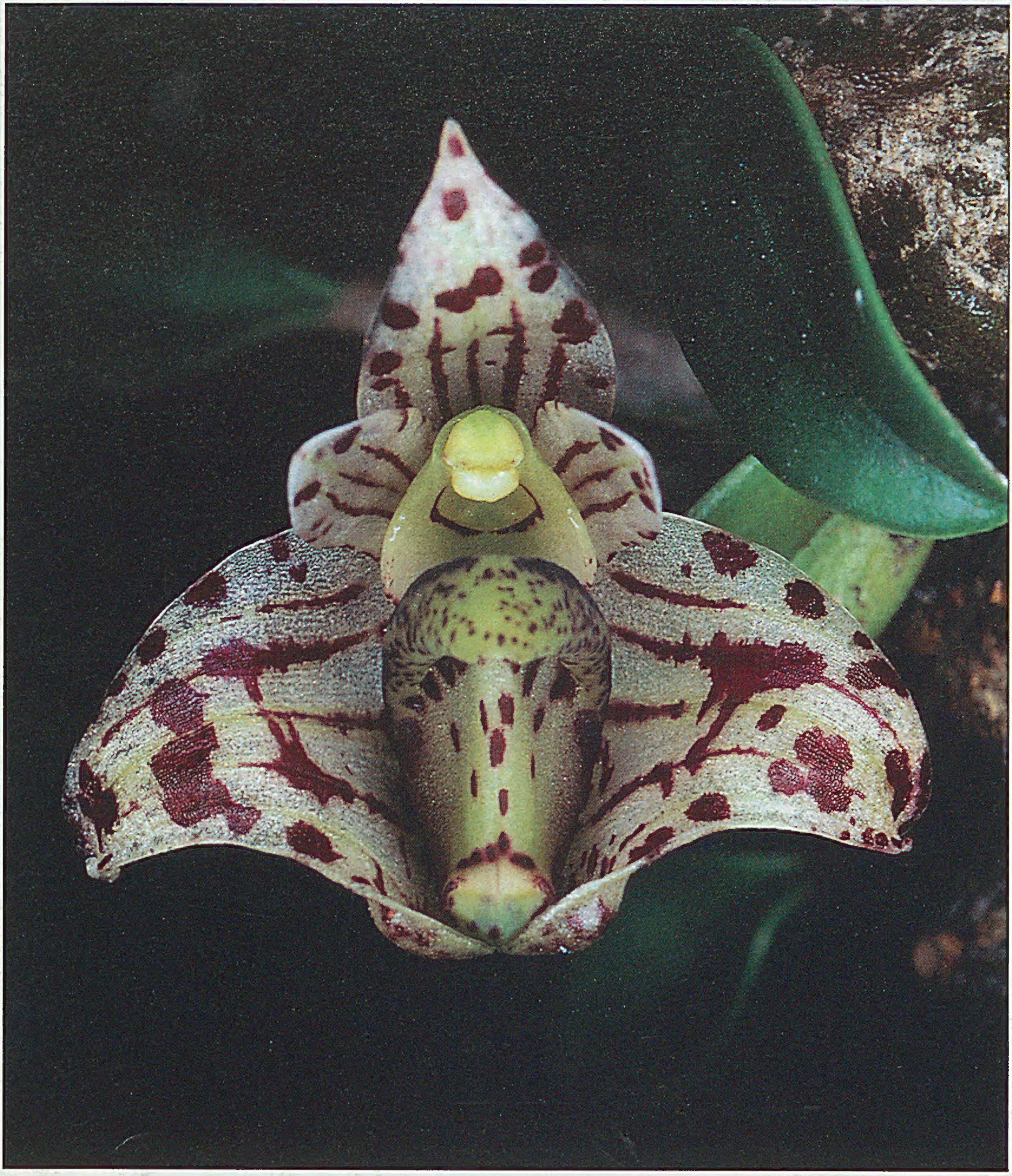

D.P. Banks

Bulbophyllum weinthalii **subsp.** ***striatum***

A newly described subspecies from Kroombit Tops, Queensland.

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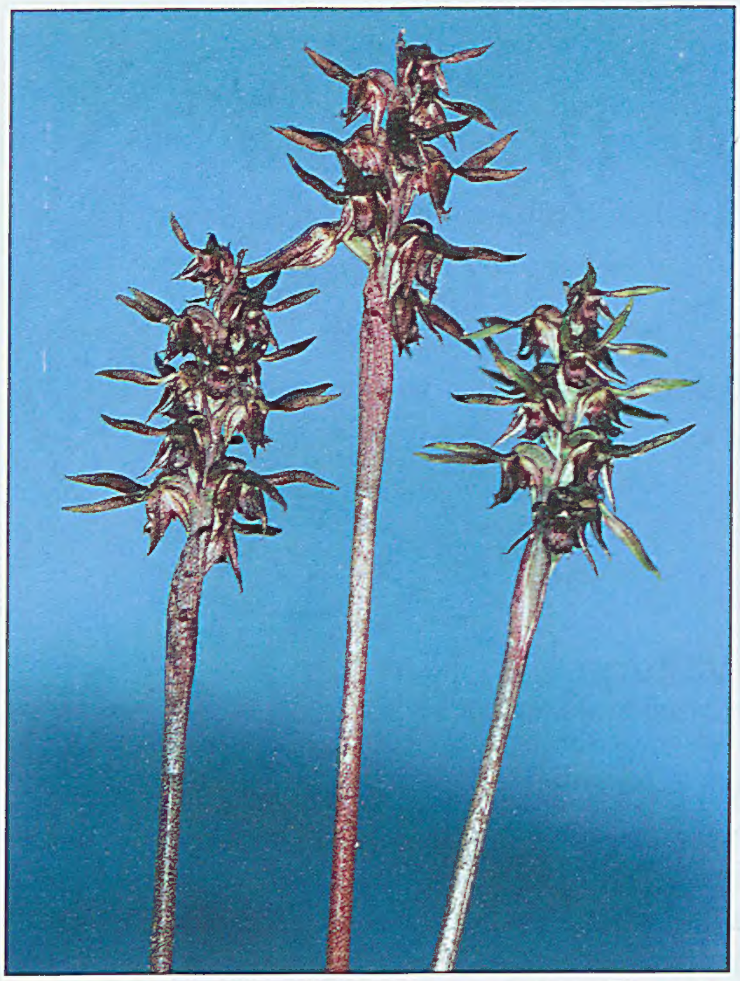
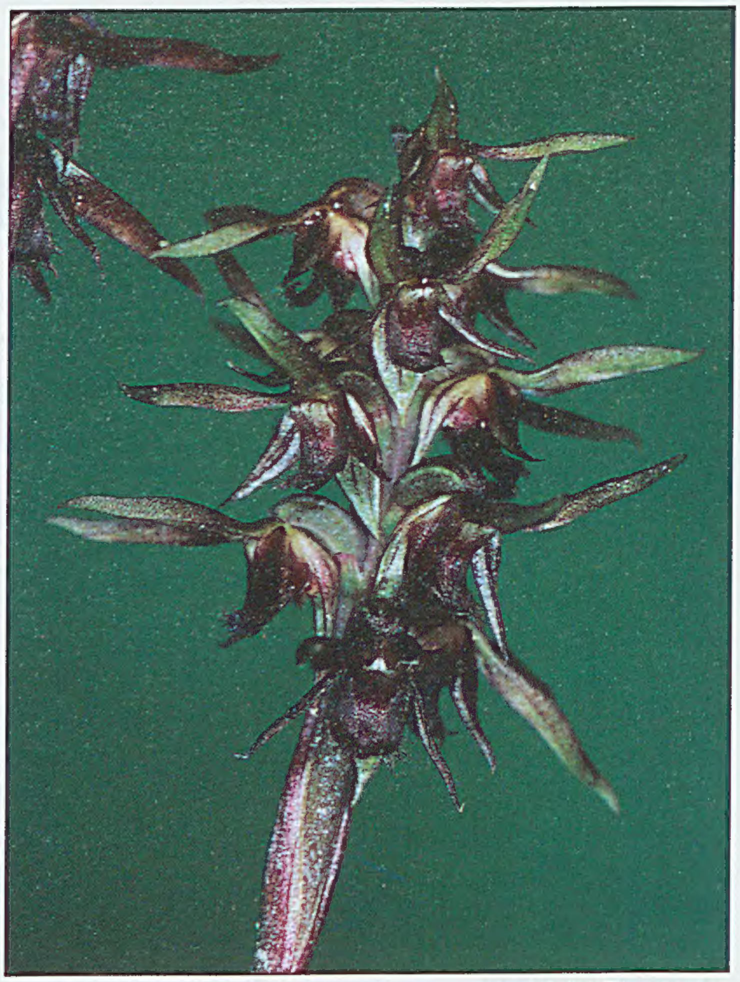


M.A. Clements

Genoplesium formosum
from Cathcart, New South Wales



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Genoplesium formosum
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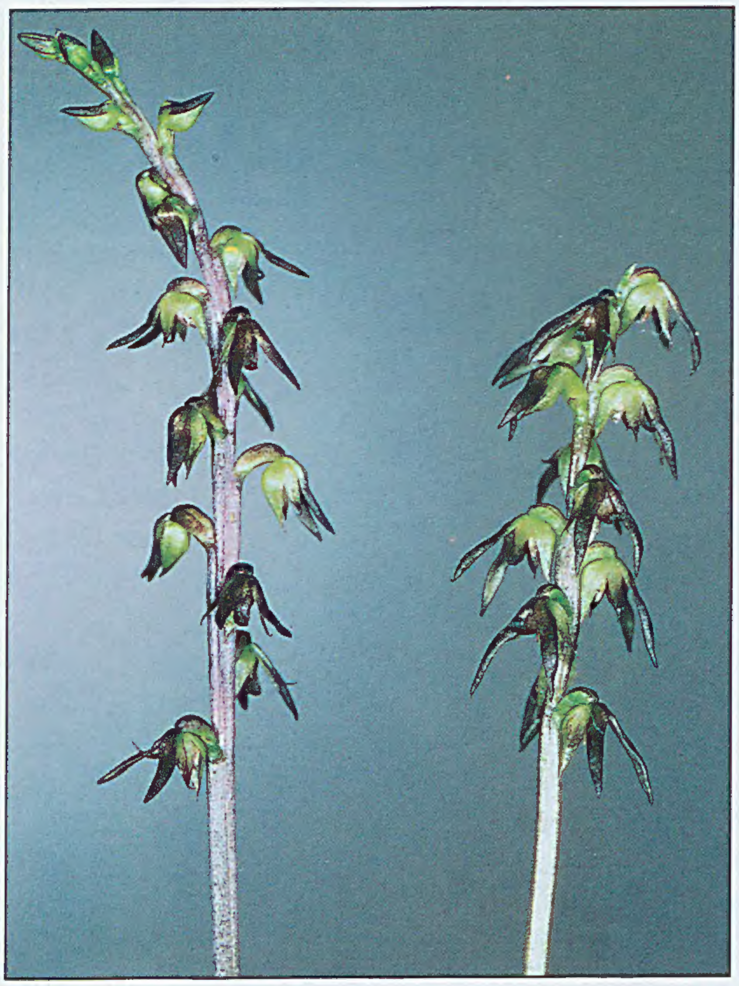

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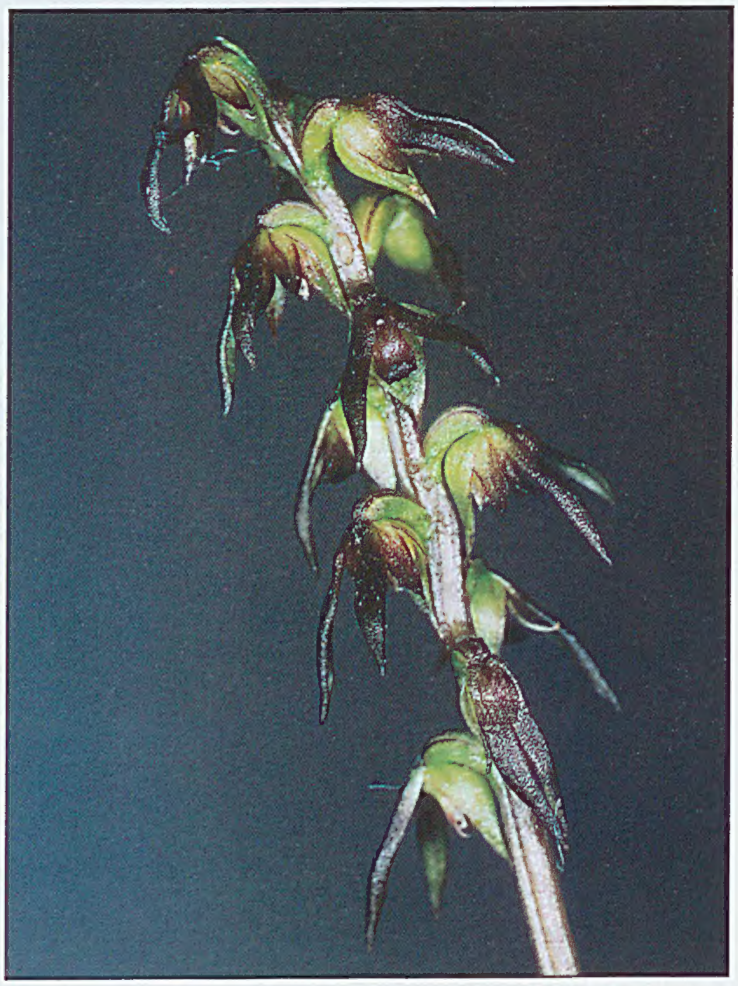
Genoplesium littoralis
from Tuncurry, New South Wales



M.A. Clements

Genoplesium littoralis
from Tuncurry, New South Wales

Six New Species and a New Combination in *Genoplesium* R.Br. (Orchidaceae) from eastern Australia

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Abstract

Genoplesium formosum, G. insignis, G. littoralis, G. oliganthum, G. ostrinum and *G. vernalis* are described as new and a new combination in *Genoplesium* is made for *Prasophyllum ruppii*. All species are illustrated and notes on habitat and ecology are included.

Key words

Orchidaceae, *Genoplesium formosum, G. insignis, G. littoralis, G. oliganthum, G. ostrinum, G. ruppii, G. vernalis, Prasophyllum ruppii*, rare, new species, Australian flora, New South Wales, Victoria.

Introduction

Genoplesium R.Br., a predominantly Australian genus with two species in New Zealand and one in New Caledonia, consists of about 50 described species, with three species named in the last two years (Jones 1999, Jones 2000a, 2000b) and a review of the genus in Tasmania (Jones 1998). Continuing studies have revealed a number of new species six of which are described here.

Prasophyllum *ruppii* R.S.Rogers, treated as a synonym of *G. woollsii* (F.Muell.) D.L.Jones & M.A.Clem. in a review of the genus (Jones & Clements 1989) has, after further studies, been found to be distinct at the species level and a new combination in *Genoplesium* is made here to accommodate it.

Methods

All types or photographs of types of taxa relevant to this study have been examined. Measurements given in the descriptions are from living plants.

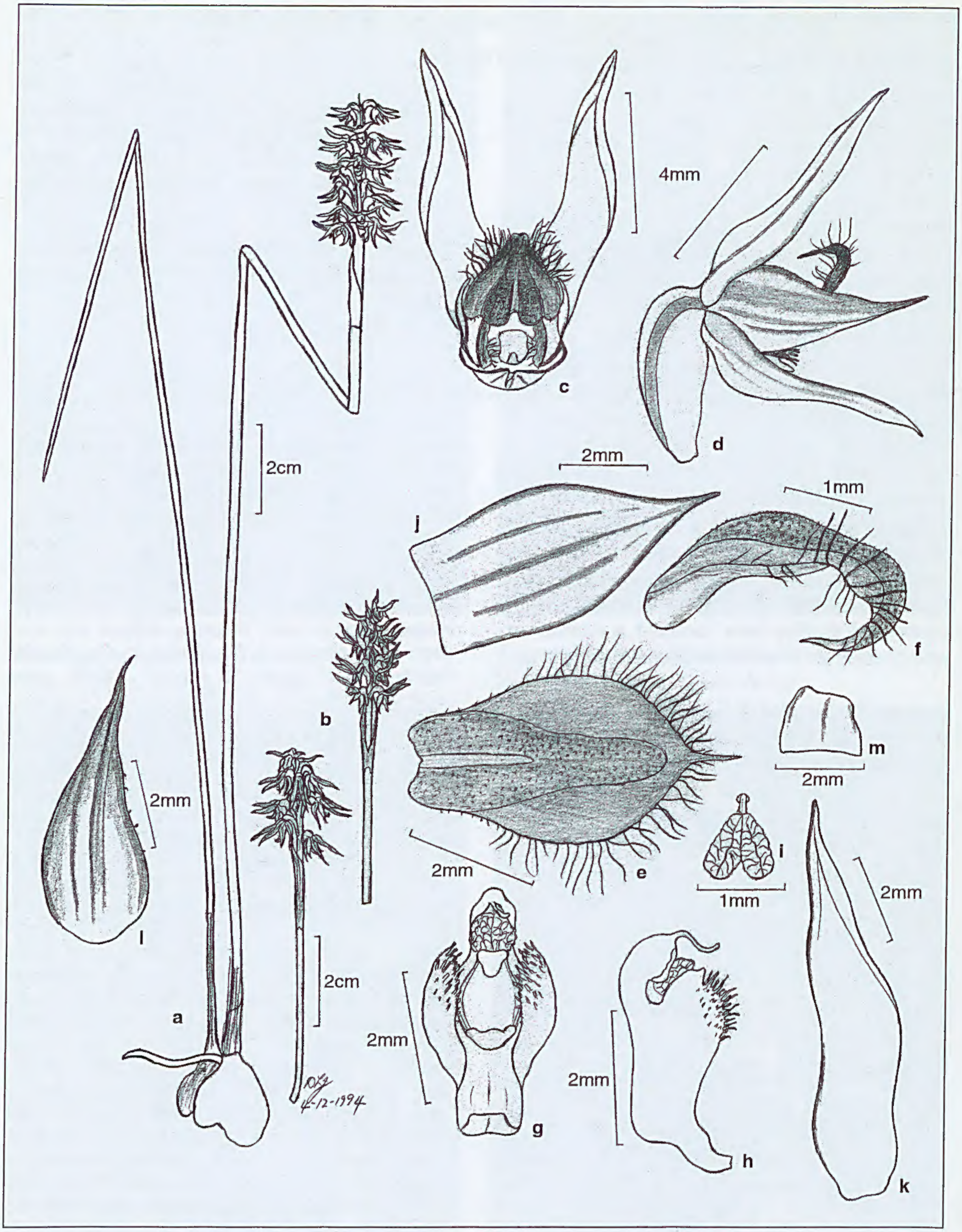
Taxonomy

1. *Genoplesium formosum* D.L.Jones, sp. nov., *G. morino* D.L.Jones affinis, sed floribus majoribus, sepalis lateralibus et petalis longioribus, iis integris vel parce ciliatis, et labello obovato callo crassiore carnoso, differt.

Typus: New South Wales; Wadbilliga National Park, 16 Dec. 1995, D.L.Jones 14717 & B.E.Jones (holo CANB (CBG 9609790); iso MEL, NSW).

Illustration: None found.

Terrestrial tuberous *herb. Leaf* 6-30 cm long, 0.15-0.3 cm wide, terete, dark green, reddish at the base; lamina closely sheathing throughout, oblanceolate-subulate, 10-20 mm long, 3-4 mm wide, ending just below the first flower. *Inflorescence* 10-35 cm tall, bearing 10-25 flowers in a densely crowded spike 2-4 cm long. *Flowers* 5-6 mm diam., dark reddish to reddish purple, porrect to semi-nodding; lateral sepals obliquely erect to erect, becoming deflexed with age. *Ovary* linear-obovoid, c. 5 mm long, c. 2 mm wide, slightly curved, green to reddish. *Dorsal sepal* cucullate, elliptic-ovate when flattened, 6.5-7 mm long, 2.6-3 mm wide, reddish with 3-5 darker lines, shallowly concave, margins entire, apex attenuate to acuminate. *Lateral sepals* nearly parallel, narrowly oblong-lanceolate, 8-9 mm long, 1.6-2 mm wide, base slightly gibbous, margins entire, distal margins involute, apex bluntly acute, lacking a vestigial gland. *Petals* porrect, ovate-lanceolate, 6-6.5 mm long, c. 2.5 mm wide, margins entire or with a few minute cilia, apex long-acuminate. *Labellum* attached by a short claw to the apex of the column foot; *lamina* obovate, 4.5-5 mm long, 2.5-2.8 mm wide, dark purplish red, shallowly curved over most of its length, suddenly recurved in the distal third, contracted to a long-apiculate apex, margins slightly irregular, with coarse spreading dark cilia to 0.8 mm long. *Callus* extending nearly to the labellum apex, occupying about half the ventral surface of the lamina, oblong-lanceolate, constricted above the middle, fleshy, dark purplish black, colluviate, apex entire, obtuse. *Column* c. 1.5 mm long, c. 1 mm wide. *Wings* shallowly lobed, the lobes more or less equal; posterior lobe ovate, light red; anterior lobe ovate, dark red, the anterior surface and margins densely and irregularly ciliate. *Anther* c. 0.7 mm long, with a linear to filiform rostrum about 0.3 mm long. *Stigma* elliptic, c. 0.5 mm long, c. 0.4 mm wide. *Pollinarium* c. 1 mm long; pollinia c. 0.8 mm long, yellow, granular; caudicle ligulate, c. 0.2 mm long; viscidium c. 0.2 mm wide. *Capsules* erect, narrowly obovoid, 5-8 mm long, c. 0.4 mm wide. **Fig. 1.**



***Genoplesium formosum*, New South Wales.**

(**a.** Wadbilliga National Park, NSW, *D.L. Jones 14724* ; **b-m** near Cathcart, NSW, *D.L. Jones 13743*) **Fig. 1.** **a**,**b** plants; **c**. flower from front; **d**. flower from side; **e**. labellum from above, flattened out; **f**. labellum from side; **g**. column from front; **h**. column from side; **i**. pollinarium; **j**. dorsal sepal; **k**. lateral sepal; **l**. petal; **m**. fertile bract.

Drawing 4/12/1994 by D.L. Jones. ©

Distribution and ecology

Occurs between Wadbilliga and Cathcart in south-eastern New South Wales, growing among shrubs on or close to the margins of montane swamps; less commonly amongst grass bordering rivulets and other small streams. Soils are moist brown to blackish loams.
Altitude: 750-800 m.
Flowering period: October to December.

Recognition

Robust midge orchid of montane swamp margins with relatively large, densely crowded, dark reddish to reddish-purple flowers, large lateral sepals and petals and an obovate, fleshy labellum with a strongly colluviate callus.

Similar Species

Genoplesium morinum has strongly nodding flowers with smaller perianth parts, a narrower, less fleshy labellum, distinctly ciliate petals and minutely denticulate anterior column wings; *Genoplesium arrectum* has smaller flowers with stiffly erect lateral sepals.

Notes

As with the other montane midge orchids *G. arrectum* and *G. morinum*, the leaf of the previous season is often still extant on flowering plants. At one site near Cathcart, this species appears to have spread into exposed gravelly road verge. The plants at this site are invariably stunted but have flowers of similar dimensions to other localities.

Conservation Status

Scattered, disjunct, often locally common and conserved in the Southeast Forests National Park and Wadbilliga National Park.

Etymology

From the Latin *formosus*, finely formed, handsome; in reference to the striking flowers and dense inflorescence.

Specimens examined

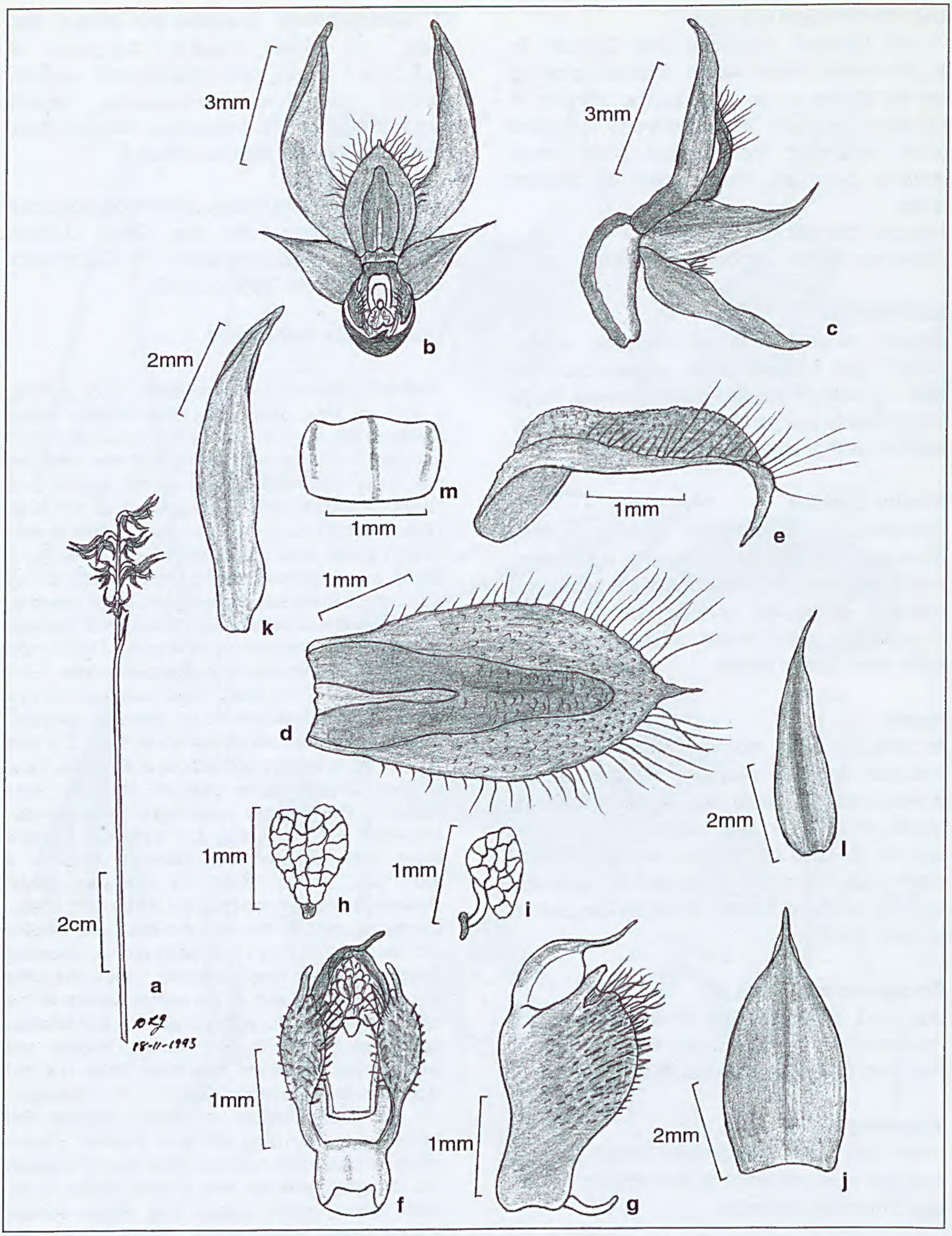
New South Wales. c. 10 km E of Cathcart towards Wyndham, 3 Dec. 1994, *Jones 13743 & Jones* (CANB, MEL, NSW); Nunnock Swamp, Southeast Forests National Park, 7 Jan. 2000, *Jones 17114 & FitzGerald* (CANB).

2. ***Genoplesium insignis*** **D.L.Jones, sp. nov.,** *G. archeri* (Hook.f.) D.L.Jones et M.A.Clem. affinis, sed florescentia vernali, floribus majoribus atro-purpureis, sepalis gracilioribus, petalis longioribus angustioribus, et labello oblongo-elliptico, differt.

Typus: New South Wales. Lake Macquarie State Recreation Area, 26 Aug. 2000, *J.Riley, T.Duratovic, P.Eygelshaven & G.Borthwick (ORG3093)* (holo CANB 621200).

Illustration: None found.

Terrestrial tuberous *herb. Leaf* terete, 6-15 cm long, c. 0.15 cm wide, dark green; base reddish; lamina sheathing the scape or distally free, subulate, 10-15 mm long, 1.5-2 mm wide, ending 5-20 mm below the first flower. *Inflorescence* 9-18 cm tall, bearing 5-12 flowers in a moderately dense spike 15-25 mm long. *Flowers* porrect, c. 5 mm diam., dark purple to dark reddish purple with a dark reddish-purple labellum; lateral sepals obliquely erect. *Floral bracts* closely sheathing, transversely ovate-oblong, c. 0.8 mm long, c. 1.5 mm wide, broadly obtuse. *Ovary* linear-obovoid, c. 3.5 mm long, asymmetrically arcuate. *Dorsal sepal* cucullate, ovate-lanceolate to elliptic-lanceolate, 5-5.5 mm long, c. 2.5 mm wide, deeply concave; margins entire; apex long-acuminate to attenuate-apiculate. *Lateral sepals* narrowly linear-lanceolate, 6.5-7 mm long, c. 1.2 mm wide, not gibbous at the base, more or less parallel; distal margins involute; apex subacute. *Petals* widely spreading, narrowly ovate-lanceolate, 4.5-5 mm long, c. 1 mm wide; margins entire; apex long-acuminate. *Labellum* hinged by a short claw, porrect, mobile in a breeze; *lamina* obovate-elliptic, c. 4 mm long, c. 1.8 mm wide, fleshy, sharply recurved at the base and the apex; margins with short to long (0.3-1 mm long), coarse, spreading purple cilia; apex long-acuminate; *callus* occupying less than half the area of the ventral surface of the lamina, extending to within 1 mm of the labellum apex, dark purplish-black, colluviate, thickest and broadest just above the base then drawn out and tapered to an obtuse apex. *Column* c. 2.8 mm long, c. 1.4 mm wide, purplish to reddish. *Column foot* ligulate, c. 0.7 mm long, the apex incurved. *Column wings* very shallowly notched; lobes slightly unequal, not divergent; posterior lobe slightly longer, linear, paler, obtuse, entire; anterior lobe slightly shorter, broadly deltate, dark purplish, obtuse, curved, the anterior margins densely and irregularly ciliate, with cilia to c. 0.5 mm long. *Anther* c. 1 mm long, with a filiform rostrum c. 0.6 mm long. *Pollinarium* c. 1 mm long; *pollinia* c. 0.9 mm long, yellow, coarsely granular; *caudicle* vestigial; *viscidium* c. 0.2 mm wide. *Stigma* ovate-elliptic, c. 1 mm long, c. 0. 6 mm wide. *Capsules* not seen. **Fig. 2.**



***Genoplesium insignis*, Charmhaven – New South Wales.**

P. & B. Branwhite (D.L. Jones 12662) **Fig. 2.**

a. plant; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. column from front; **g**. column from side; **h,i** pollinarium (two views); **j**. dorsal sepal; **k**. lateral sepal; **l**. petal; **m**. fertile bract.

Drawing 18/11/1993 by D.L. Jones. ©

Distribution and Ecology

Known only from few localities in the northern part of the Central Coast of New South Wales between Charmhaven and Wyong. *Genoplesium insignis* grows in patches of *Themeda triandra* and amongst shrubs and sedges in heathland and heathy forest on grey to white sand. This habitat becomes extremely dense in the absence of fires and flowering of this orchid may be stimulated by fires (or at least flowering plants are more readily discerned on burnt ground).

Altitude: 20-100 m.

Flowering period: August to November.

Recognition

Slender spring-flowering midge orchid with relatively large, dark purple flowers with slender segments, long petals and an oblong-elliptic, ciliate labellum.

Similar Species

Genoplesium archeri, which flowers in the summer, has smaller flowers with shorter, broader segments, especially the petals, and a shorter ovate, less ciliate labellum.

Notes

This species was discovered by Peter and Boris Branwhite in 1993. It is extremely difficult to locate in the field, especially two or more years after fire, when the habitat thickens considerably.

Conservation Status

Known from only three populations totalling less than twenty plants; protected to some extent in the Lake Macquarie State Recreation Reserve; suggest 2EC according to Briggs & Leigh (1996).

Etymology

Derived from the Latin *insignis,* notable, remarkable, outstanding; the flower size and colouration are amongst the most outstanding in the genus.

Specimens Examined

New South Wales. Charmhaven, 18 Nov. 1993, *Branwhite (Jones 12662)* (CANB).

3. *Genoplesium littoralis* D.L.Jones, sp. nov., *G. despectanti* (Hook.f.) D.L.Jones et M.A.Clem. affinis, sed floribus viridibus labello brunneo, sepalis et petalis brevioribus crassioribus, et labello minore subulato, differt.

Typus: New South Wales: Tuncurry, 23 Apr. 1992, *R.G.Tunstall, J.Riley & G.Hillman (D.L.Jones 9310)* (holo CANB (CBG 9709786); iso NSW).

Illustration: Plate 124, Bishop (1996) - as *Genoplesium* sp. aff. *despectans* (Tuncurry).

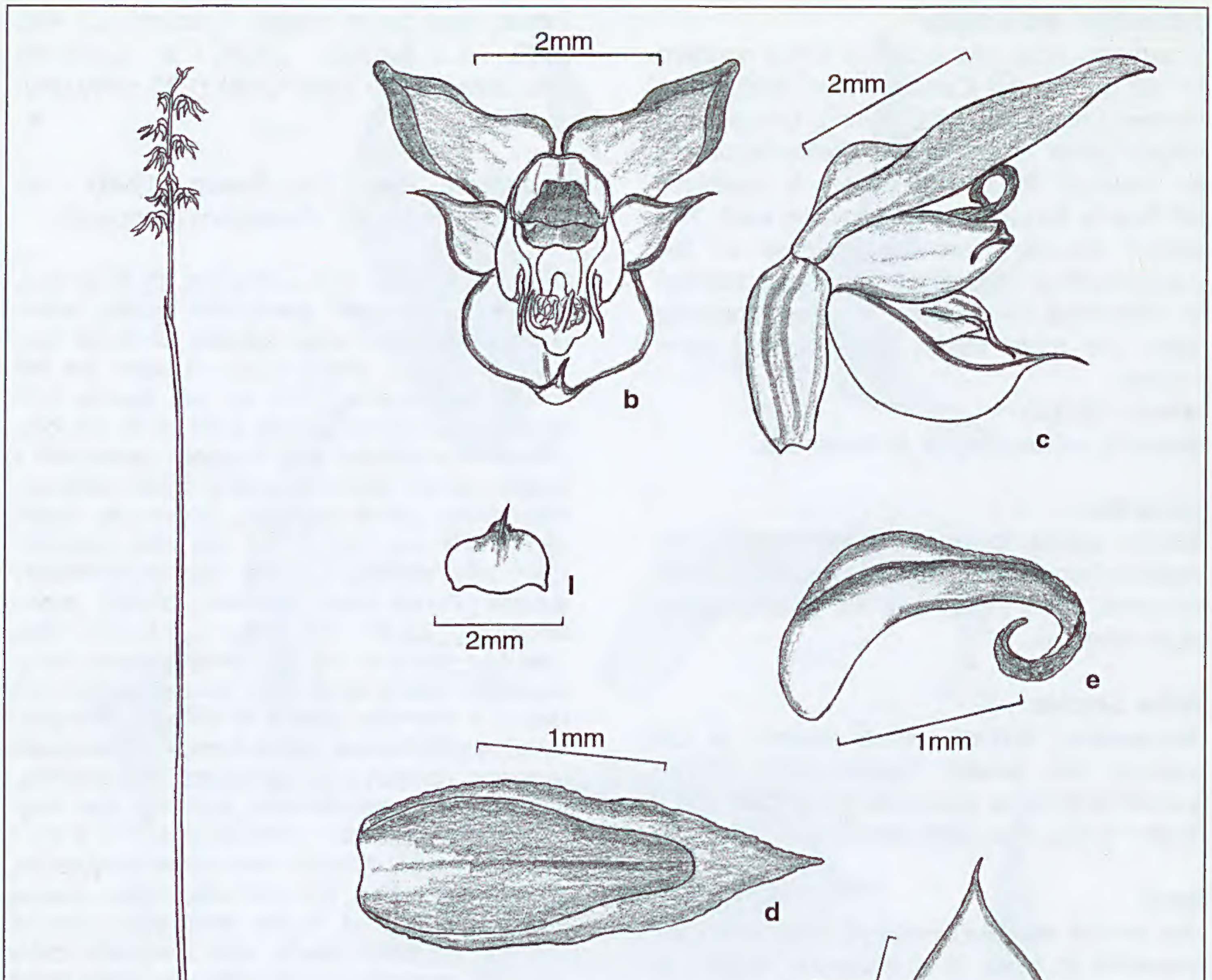
Terrestrial tuberous *herb. Leaf* terete, 10-25 cm long, c. 0.15 cm wide, dark green; base reddish; lamina closely sheathing the scape, subulate, 10-18 mm long, 1.5-2 mm wide, ending 5-20 mm below the first flower. *Inflorescence* 15-30 cm tall, bearing 5-30 flowers in a moderately dense spike 10-30 mm long. *Flowers* semi-deflexed, c. 4 mm diam., green with a purplish-brown labellum; lateral sepals deflexed. *Floral bracts* closely sheathing, transversely ovate-elliptic, c. 1 mm long, c. 1.5 mm wide, apiculate. *Ovary* linear-obovoid, c. 2 mm long, asymmetrically arcuate. *Dorsal sepal* cucullate, broadly ovate-lanceolate, 3.5-3.8 mm long, c. 2.5 mm wide, concave; margins entire, brown; apex long-acuminate. *Lateral sepals* linear-lanceolate, 4-4.5 mm long, c. 1 mm wide, gibbous at the base, divergent; distal margins involute; apex subobtuse. *Petals* widely spreading, narrowly ovate-lanceolate, 2.5-3 mm long, c. 0.8 mm wide; margins entire, brownish; apex long-acuminate to apiculate. *Labellum* hinged by a short claw, porrect, not mobile in a breeze; *lamina* subulate, c. 2.5 mm long, c. 0.8 mm wide, fleshy, sharply recurved to recoiled in the distal third; margins irregular, especially distally; apex acuminate; *callus* occupying about three-quarters the area of the ventral surface of the lamina, extending to within c. 0.7 mm of the labellum apex, dark purplish, thickest and broadest just above the base then tapered to an obtuse apex. *Column* c. 2.3 mm long, c. 1.3 mm wide, whitish. *Column foot* ligulate, c. 0.8 mm long, slightly incurved. *Column wings* notched in the distal third; lobes markedly unequal, not divergent; posterior lobe relatively short, linear-oblong, whitish, obtuse, entire; anterior lobe much longer, narrowly linear, dark purplish, acuminate, curved, anterior margins irregular. *Anther* c. 1 mm long, with a filiform rostrum c. 0.7 mm long. *Pollinarium* c. 0.8 mm long; *pollinia* c. 0.6 mm long, yellow, coarsely granular; *caudicle* c. 0.1 mm long; *viscidium* c. 0.2 mm wide. *Stigma* ovate-elliptic, c. 1 mm long, c. 0. 6 mm wide. *Capsules* not seen. **Fig. 3.**

Distribution and Ecology

Restricted to the vicinity of Tuncurry on the North Coast of New South Wales where it grows on stabilised dunes in littoral communities dominated by coastal tea-tree (*Leptospermum laevigatum*) and coastal Banksia (*B. integrifolia*) in grey sandy loam.

Altitude: 2-10 m.

Flowering period: March to May.



***Genoplesium littoralis*, Tuncurry – New South Wales.**

R.G. Tunstall, J.J. Riley & G. Hillman (D.L. Jones 9310), **Fig. 3.**

a. plant; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. column from front; **g**. column from side; **h**. pollinarium; **i**. dorsal sepal; **j**. lateral sepal; **k**. petal; **l**. fertile bract.

Drawing 25/4/1992 by D.L. Jones. ©

Recognition

Slender midge orchid of coastal vegetation with numerous, crowded, semi-deflexed flowers with green, acuminate sepals and petals and a small, subulate, brown labellum with an acuminate apex.

Similar Species

Genoplesium despectans has dark purplish flowers with more slender, finely acuminate segments and a larger labellum with a long-acuminate apex.

Notes

A number of species of *Genoplesium* grow in coastal heathland, but coastal scrub on stabilised dunes close to the sea is an unusual habitat for species of this genus.

Conservation Status

Highly localised and not conserved; much of the surrounding area has been subject to sand mining and is unlikely to now support populations of this orchid; suggest 1E according to Briggs & Leigh (1996).

Etymology

From the Latin *littoralis*, pertaining to the sea shore, in reference to the habitat where this species grows.

4. *Genoplesium oliganthum* D.L.Jones, sp. nov., *G. plumoso* (Rupp) D.L.Jones et M.A.Clem. affinis, sed scapo gracillimo, floribus paucioribus (1-9) viridi-brunneis, et labello minore elliptico, differt.

Typus: New South Wales. c. 19.1 km NE of Braidwood, beside road to Nerriga, 16 Feb. 1992, *D.L.Jones 9033 & B.E.Jones* (holo CANB (CBG 9220317); iso AD, BRI, MEL, NSW, K).

Illustration: None found.

Terrestrial tuberous *herb*. *Leaf* terete, 8-20 cm long, c. 0.15 cm wide, dark green; base reddish; lamina closely sheathing the scape, subulate, 10-18 mm long, 1.5-2 mm wide, ending 5-20 mm below the first flower. *Inflorescence* 15-30 cm tall, bearing 1-9 flowers in a moderately dense spike 10-20 mm long. *Flowers* semi-deflexed, c. 9 mm diam., greenish brown to reddish green with prominent purplish stripes on the dorsal sepal and petals and a reddish-purple labellum; lateral sepals obliquely erect. *Floral bracts* closely sheathing, transversely ovate-elliptic, c. 1.5 mm long, c. 2 mm wide, apiculate. *Ovary* linear-obovoid, c. 4 mm long, asymmetrically arcuate. *Dorsal sepal* cucullate, broadly ovate-lanceolate, 5-5.5 mm long, c. 3 mm wide, concave, with 3 prominent purple stripes; margins entire, purplish; apex long-acuminate to attenuate. *Lateral sepals* linear-lanceolate, 6.5-7 mm long, c. 1.8 mm wide, not gibbous at the base, widely divergent; distal margins involute; apex subacute to apiculate. *Petals* widely spreading, narrowly ovate-lanceolate, 5-5.5 mm long, c. 1.8 mm wide, with 3 prominent purple stripes; margins entire, purple; apex long-acuminate. *Labellum* hinged by a short claw, porrect, not mobile in a breeze; *lamina* elliptic, c. 5 mm long, c. 2.7 mm wide, fleshy, sharply recurved in the distal third; margins with short to long (0.3-1 mm long), coarse, spreading purple cilia; apex acute; *callus* occupying about half the area of the ventral surface of the lamina, extending nearly to the labellum apex, dark purplish-black, thickest and broadest just above the base then drawn out and tapered to an obtuse apex. *Column* c. 3 mm long, c. 1.8 mm wide, whitish to reddish. *Column foot* ligulate, c. 1 mm long, the apex incurved. *Column wings* notched in the distal quarter; lobes of similar length, slightly divergent; posterior lobe deltate, whitish, obtuse, entire; anterior lobe narrowly deltate, dark purplish, subacute, curved, the anterior margins irregularly ciliate. *Anther* c. 1.3 mm long, with a filiform rostrum c. 0.8 mm long. *Pollinarium* c. 1 mm long; *pollinia* c. 0.8 mm long, yellow, coarsely granular; *caudicle* c. 0.1 mm long; *viscidium* c. 0.2 mm wide. *Stigma* ovate-elliptic, c. 1 mm long, c. 0. 6 mm wide. *Capsules* not seen.

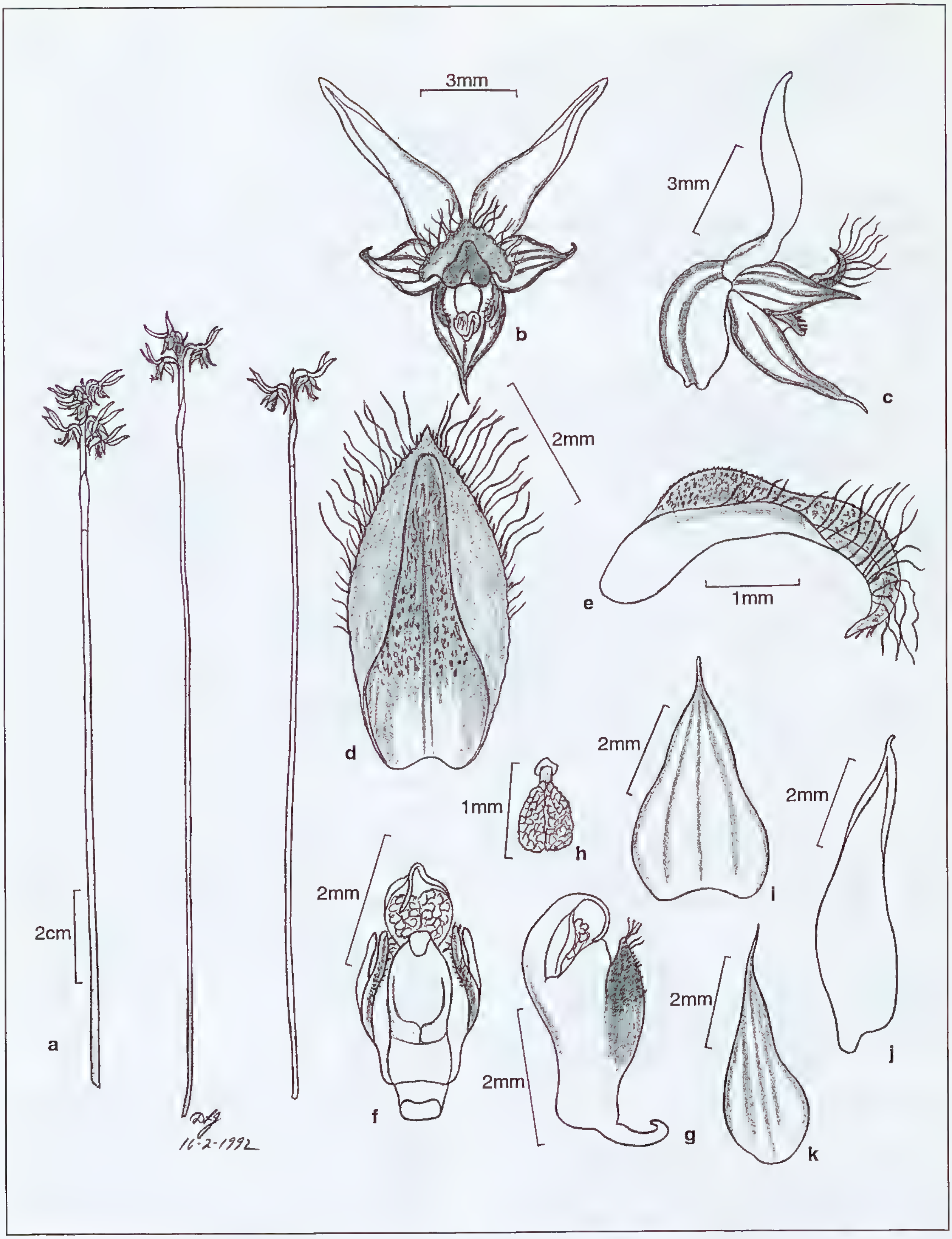
Fig. 4.

Recognition

Short, slender midge orchid of the southern tablelands of New South Wales with few-flowered (1-9 flowers) spikes of striped, greenish-brown to reddish-green flowers with a dark reddish-purple ciliate labellum.

Similar Species

Genoplesium plumosum has larger flowers of similar colouration but with a much longer labellum; *Genoplesium sagittiferum* has larger bright green flowers with a larger labellum.



Genoplesium oliganthum, Braidwood – Nerriga Road – N.S.W.

(*D.L. Jones s.n.*) **Fig. 4.**

a. plants; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. column from front; **g**. column from side; **h**. pollinarium; **i**. dorsal sepal; **j**. lateral sepal; **k**. petal.

Drawing 16/2/1992 by D.L. Jones. ©

Notes

At various localities this species grows with *G. ostrinum*, *G. plumosum* and *G. superbum* but natural hybrids are unknown.

Conservation Status

Widely distributed and often locally common but apparently not conserved in any reserve; in recent years much of the habitat where this species grows has been subdivided and sold for housing and hobby farms; suggest 2R according to Briggs & Leigh (1996).

Etymology

Derived from the Greek *oliganthus*, few-flowered.

Specimens Examined

New South Wales: c. 4.5 km S of the Mongarlowe River crossing beside the Nerriga-Braidwood road, 3 Mar. 1990, *Jones 5693* (CANB, MEL, NSW); c. 19 km along Braidwood road towards Nerriga, 24 Feb. 1993, *Tunstall (Jones 11413)* (CANB); Half Moon Reserve, NE of Mongarlowe, 1 Mar. 1993, *Jones 11424* (CANB); c. 1.5 km E of Mongarlowe, 1 Mar. 1993, *Jones 11430* (CANB); c. 1 km from Nerriga towards Braidwood, 8 Mar. 1997, *Jones 15109* (CANB); c. 6.5 km along Mongarlowe road from Braidwood-Nerriga road, 8 Mar. 1997, *Jones 15116 & Clements* (CANB); c. 10 km along Mongarlowe road from Braidwood-Nerriga road, 8 Mar. 1997, *Jones 15118 & Clements* (AD, BRI, CANB, MEL, NSW); Mongarlowe, 8 Mar. 1997, *Jones 15121 & Clements* (CANB).

5. *Genoplesium ostrinum* D.L.Jones, sp. nov., *G. morrisii* (Nicholls) D.L.Jones et M.A.Clem. affinis, sed floribus minoribus, segmentis tenuioribus, et labello angustiore callo obscuro, differt.

Typus: c. 19.1 km NE of Braidwood, beside road to Nerriga, 16 Feb. 1992, *D.L.Jones 9031 & B.E.Jones* (holo CANB (CBG 9407748); iso AD, BRI, MEL, NSW).

Illustration: None found.

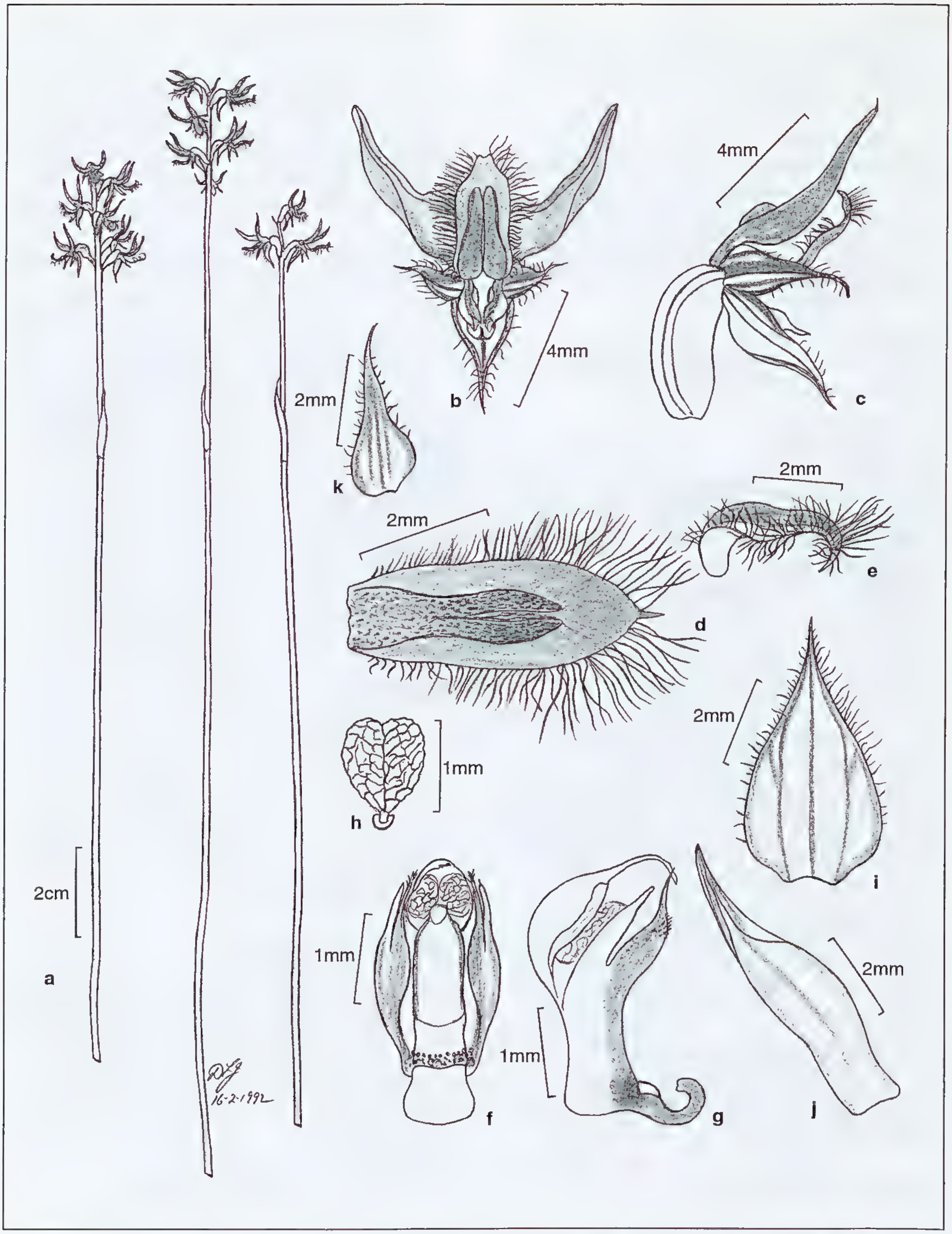
Terrestrial tuberous *herb. Leaf* terete, 15-28 cm long, c. 0.15 cm wide, dark green; base reddish; lamina closely sheathing the scape, subulate, 10-22 mm long, 1.5-2 mm wide, ending 3-5 cm below the first flower. *Inflorescence* 20-35 cm tall, bearing 3-10 flowers in a moderately dense spike 10-30 mm long. *Flowers* porrect, c. 8.5 mm diam., dark purple with darker stripes on the dorsal sepal and petals and a dark purple labellum; lateral sepals obliquely erect. *Floral bracts* closely sheathing, transversely ovate-elliptic, c. 1.5 mm long, c. 2 mm wide, apiculate. *Ovary* linear-obovoid, c. 5 mm long, asymmetrically arcuate. *Dorsal sepal* cucullate, broadly ovate-lanceolate, 5.5-6 mm long, c. 3 mm wide, concave, with 3 prominent purple stripes; margins purplish, with numerous coarse cilia to 0.5 mm long; apex long-acuminate. *Lateral sepals* linear-lanceolate, 6.5-7.5 mm long, c. 1.5 mm wide, gibbous at the base, widely divergent; distal margins involute; apex subacute. *Petals* widely spreading, narrowly ovate-lanceolate, 3.5-4 mm long, c. 1.5 mm wide, with 3 prominent purple stripes; margins purple, with coarse cilia to 0.3 mm long; apex long-acuminate. *Labellum* hinged by a short claw, porrect, mobile in a breeze; *lamina* narrowly oblong-obovate, c. 5 mm long, c. 1.6 mm wide, thin and fleshy, recurved at the base and the apex; margins with numerous short to long (0.3-1 mm long), coarse, spreading purple cilia; apex acutely apiculate; *callus* occupying less than half the area of the ventral surface of the lamina, extending two-thirds of the distance to the labellum apex, dark purplish-black, colluviate, thickest and broadest just above the base then constricted before expanding to an obtuse or emarginate apex. *Column* c. 3 mm long, c. 1.5 mm wide, purplish-white. *Column foot* ligulate, c. 1 mm long, the apex incurved. *Column wings* notched in the distal half; lobes unequal, slightly divergent; posterior lobe shorter, linear, whitish, obtuse, entire; anterior lobe longer, narrowly lanceolate, dark purplish, long-acuminate, curved, the anterior margins irregularly and shortly ciliate. *Anther* c. 1.3 mm long, with a filiform rostrum c. 1 mm long. *Pollinarium* c. 1.2 mm long; *pollinia* c. 1 mm long, yellow, coarsely granular; *caudicle* c. 0.1 mm long; *viscidium* c. 0.2 mm wide. *Stigma* ovate-elliptic, c. 1 mm long, c. 0. 6 mm wide. *Capsules* not seen. **Fig. 5.**

Distribution and Ecology

Occurs on the southern tablelands of New South Wales where distributed between Mongarlowe and Braidwood. It grows among low shrubs and grass tussocks in heathy open forest and woodland dominated by scribbly gums (*Eucalyptus rossii*). Soils are grey to brown gravelly loams.
Altitude: 600-700 m.
Flowering period: February to April.

Recognition

Slender midge orchid of the southern tablelands of N.S.W. with few-flowered (1-10 flowers) spikes of dark purple flowers which have thin segments, a ciliate dorsal sepal and petals and a narrowly oblong-ovate labellum with prominent coarse marginal cilia.



***Genoplesium ostrinum*, Braidwood – Nerriga Road – N.S.W.**

(*D.L. Jones 9031*) **Fig. 5.**

a. plants; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. column from front; **g**. column from side; **h**. pollinarium; **i**. dorsal sepal; **j**. lateral sepal; **k**. petal.

Drawing 16/2/1992 by D.L. Jones. ©

Similar Species

Genoplesium morrisii has larger flowers with much thicker segments and a broader, ovate-oblong labellum with a well-developed strongly colluviate callus; *Genoplesium simulans* has even larger flowers with an obovate to spathulate labellum constricted just below the middle.

Notes

Grows with *G. oliganthum* but natural hybrids are unknown. *Genoplesium ostrinum* has been included under *G. morrisii* (see for example Jones 1993), but these taxa are considered distinct at specific rank. *Genoplesium morrisii* is now known to be confined to Victoria and Tasmania.

Conservation Status

Often locally common but apparently not conserved in any reserve; in recent years much of the habitat where this species grows has been subdivided and sold for housing and hobby farms; suggest 2R according to Briggs & Leigh (1996).

Etymology

From the Latin *ostrinus*, purple, in reference to the dark purple flowers.

Specimen Examined

New South Wales. Mongarlowe, 8 Mar. 1997, *Jones 15121 & Clements* (CANB, MEL, NSW).

6. *Genoplesium ruppii* (R.S.Rogers) D.L.Jones, comb. et stat. nov.,

Basionym: *Prasophyllum ruppii* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 51: 292-3 (1927). Type: New South Wales, Paterson, Feb. 1927, *H.M.R.Rupp* (holo AD!).

Illustration: None found.

Terrestrial tuberous *herb. Leaf* terete, 10-18 cm long, c. 0.15 cm wide, dark green; base reddish; lamina sheathing the scape or distally free, subulate, 8-15 mm long, 1.5-2 mm wide, ending 10-20 mm below the first flower. *Inflorescence* 8-15 cm tall, bearing 10-c.25 flowers in a moderately dense spike 15-30 mm long. *Flowers* deflexed, c. 4 mm diam., greenish with a dark purple labellum; lateral sepals obliquely erect. *Floral bracts* closely sheathing, transversely oblong, c. 0.8 mm long, c. 1 mm wide, almost trifid, broadly obtuse. *Ovary* linear-obovoid, curved, c. 2.7 mm long, asymmetrically arcuate. *Dorsal sepal* cucullate, broadly ovate to broadly ovate-lanceolate, 2.7-3 mm long, c. 2.5 mm wide, deeply concave; margins with numerous short glandular cilia; apex acuminate. *Lateral sepals* narrowly oblong-lanceolate, 4.5-5 mm long, c. 1.2 mm wide, slightly gibbous at the base, divergent; distal margins involute; apex subacute, with a vestigial gland. *Petals* widely spreading, ovate-lanceolate, 2.3-2.5 mm long, c. 1.2 mm wide; margins with numerous short glandular cilia; apex long-acuminate. *Labellum* hinged by a short claw, porrect to deflexed, not mobile in a breeze; *lamina* broadly ovate-elliptic, c. 2.5 mm long, c. 1.6 mm wide, fleshy; margins with numerous, short (c. 0.2 mm long), multiseriate, glandular, dark purple cilia; apex acute to acuminate; *callus* occupying less than half the area of the ventral surface of the lamina, extending to within 0.8 mm of the labellum apex, dark purplish-black, colluviate, thickest and broadest near the middle then tapered to an obtuse apex. *Column* c. 2.2 mm long, c. 1.4 mm wide, purplish. *Column foot* ligulate, c. 0.7 mm long, the apex incurved. *Column wings* notched about halfway; lobes unequal, not divergent; posterior lobe shorter, oblong, paler, obtuse, entire; anterior lobe longer, lanceolate, dark purplish, acuminate, curved, the anterior margins densely and irregularly ciliate, with cilia to c. 0.2 mm long. *Anther* c. 0.8 mm long, with a filiform rostrum c. 0.3 mm long. *Pollinarium* c. 0.8 mm long; *pollinia* c. 0.7 mm long, yellow, coarsely granular; *caudicle* c. 0.1 mm long; *viscidium* c. 0.2 mm wide. *Stigma* ovate-elliptic, c. 0.7 mm long, c. 0. 5 mm wide. *Capsules* not seen. Fig. 6.

Distribution and Ecology

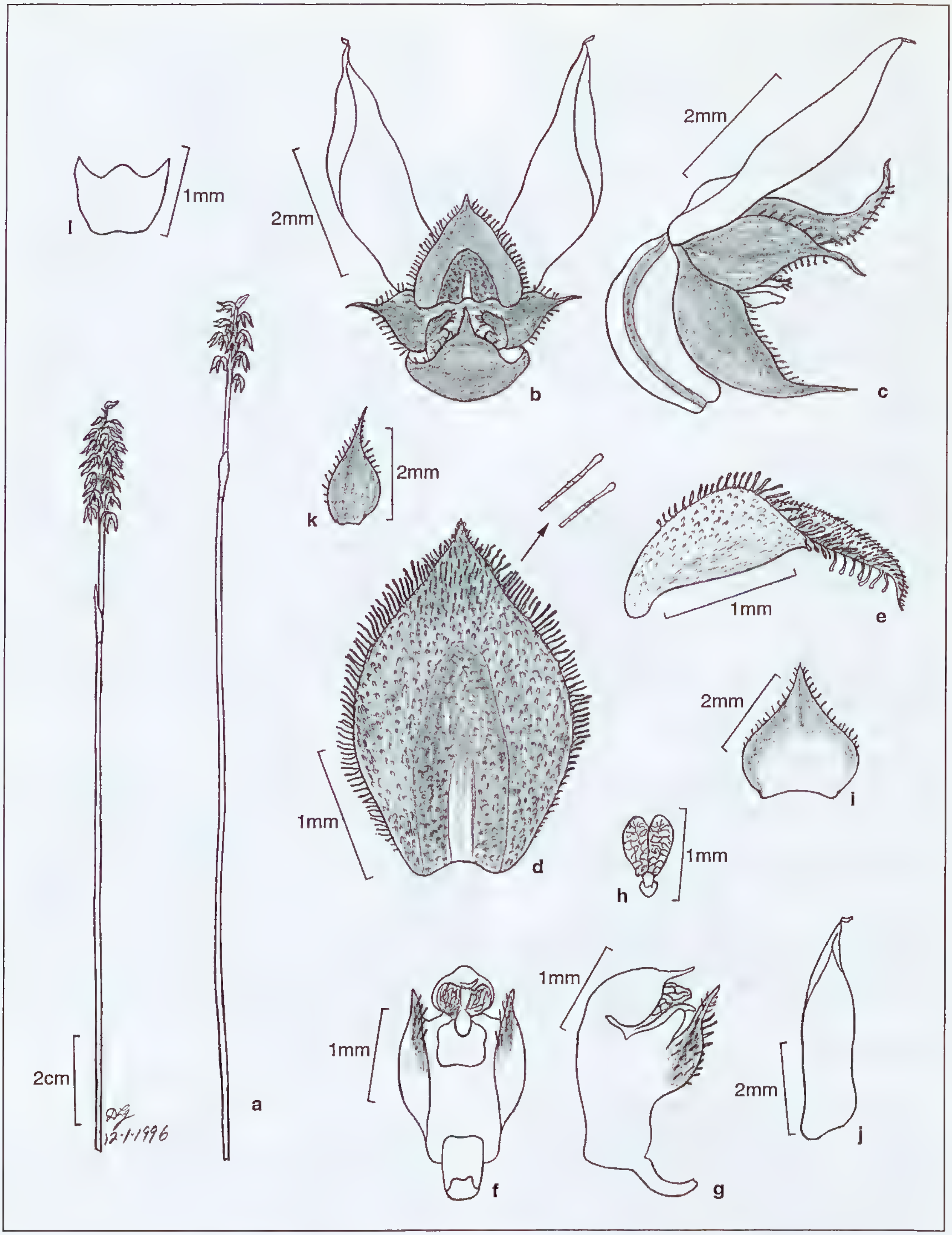
Disjunctly distributed between Paterson and Hornsby on the New South Wales central coast. Rupp (1943) also records it from the southern approaches to Barrington Tops but it has not been recollected here since then. It grows in a range of habitats including *Melaleuca*-dominated semi-swamp in clay soils; *Themeda triandra* grassy areas adjacent to low sites dominated by *Banksia robur* and heathy forest on lateritic and gravelly soils.
Altitude: 50-500 m.
Flowering period: January to April.

Recognition

Slender summer-flowering midge orchid with small greenish flowers which have a dark purple labellum and short glandular cilia on the margins of the dorsal sepal, petals and labellum.

Similar Species

Genoplesium woollsii, which flowers in autumn, has larger, wholly dark purple flowers with short, coarse glandular cilia on the margins of the dorsal sepal, petals and labellum.



Genoplesium ruppii, Paterson – New South Wales.

L. Walsh (*D.L. Jones 14750*) **Fig. 6.**

a. plants; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. column from front; **g**. column from side; **h**. pollinarium; **i**. dorsal sepal; **j**. lateral sepal; **k**. petal; **l**. fertile bract.

Drawing 12/1/1996 by D.L. Jones. ©

Notes

This species was included by Jones & Clements (1989) as a synonym of *G. woollsii* but collections by Lyn Walsh of H.M.R.Rupp's collecting sites around Paterson have shown it to be a distinctive species worthy of recognition in its own right.

Conservation Status

Disjunctly distributed, sometimes locally plentiful but not known to be conserved, although a substantial patch on private land is protected by the land owners (L. Walsh pers. comm.). Suggest 2R according to Briggs & Leigh (1996).

Etymology

Named after the Reverend H.M.R.Rupp (1872-1956), noted authority on the orchids of Australia with special emphasis on New South Wales.

Specimens Examined

New South Wales. Wyee Road, Wyong, 20 Dec. 1998, *Riley & Branwhite* (CANB); Paterson, Mar. 1929, *Rupp* (MEL); *ibid*, 12 Jan. 1996, *Walsh (Jones 14750)* (CANB); *ibid*, 5 Feb. 1996, *Walsh (Jones 14794)* (CANB).

7. *Genoplesium vernalis* D.L.Jones, sp. nov.; *Genoplesium woollsii* (F.Muell.) D.L.Jones et M.A.Clem. affinis, sed suo vere florenti; labello obovato callo multum latiore et tumidiore; et marginibus sepali dorsalis, petalorum labellique minute ciliati, differt.

Typus: New South Wales. Murramarang National Park, c. 1 km N of East Lynne, 18 Oct. 1995, *D.L.Jones 14551 & M.A.Clements* (holo CANB (CBG 9519791); iso MEL, NSW).

Terrestrial tuberous *herb*. *Leaf* 10-18 cm long, 0.15-0.3 cm wide, terete, dark green, reddish at the base; lamina closely sheathing throughout, 10-15 mm long, 2-3 mm wide, oblanceolate-subulate, ending 5-20 mm below the first flower. *Inflorescence* 15-25 cm tall, bearing 10-25 flowers in a densely crowded spike 2-4 cm long. *Flowers* 3.5-4.5 mm diam., dark purplish black, porrect to semi-nodding; lateral sepals obliquely erect. *Ovary* linear-obovoid, c. 2.6 mm long, slightly curved, green. *Dorsal sepal* cucullate, broadly ovate when flattened, 3-3.5 mm long, 2-2.3 mm wide, concave, margins with minute glandular cilia, apex acuminate. *Lateral sepals* nearly parallel, narrowly oblong-lanceolate, 4-4.5 mm long, 1.2-1.3 mm wide, base gibbous, margins entire, distal margins involute, apex narrowly and bluntly acute, sometimes a vestigial gland present. *Petals* porrect to spreading, narrowly ovate-lanceolate, c. 3 mm long, c. 1.2 mm wide, margins with minute glandular cilia, apex long-acuminate. *Labellum* attached by a short claw to the apex of the column foot; *lamina* narrowly oblong-elliptic, 2.5-2.8 mm long, 1.2-1.5 mm wide, shallowly curved throughout, suddenly contracted to an apiculate apex, externally papillate, margins denticulate, distal margins slightly irregular, with minute glandular cilia. *Callus* extending nearly to the labellum apex, occupying most of the ventral surface of the lamina, oblong, sometimes constricted above the middle, fleshy, dark purple to brownish black, base yellow, surface colluviate, apex entire. *Column* c. 2 mm long, c. 1.8 mm wide. *Wings* lobed about halfway to the base, the lobes not divergent; posterior lobe linear, whitish, obtuse; anterior lobe ovate-lanceolate, dark red, acute, the margins irregularly denticulate. *Anther* c. 0.8 mm long, with a linear to filiform rostrum about 0.3 mm long. *Stigma* broadly elliptic, c. 0.5 mm long, c. 0.5 mm wide. *Pollinarium* c. 1 mm long; pollinia c. 0.8 mm long, yellow, granular; *caudicle* ligulate, c. 0.15 mm long; *viscidium* c. 0.2 mm wide. *Capsules* erect, narrowly obovoid, 4-5 mm long, c. 0.3 mm wide.

Fig. 7.

Distribution and ecology

Occurs on the South Coast of New South Wales between Ulladulla and Mogo, extending about 5-30 km inland from the coast. Grows in shrubby open eucalypt forest in sandy clay loam and gravelly clay loam.

Altitude: 50-100 m.

Flowering period: September to December.

Recognition

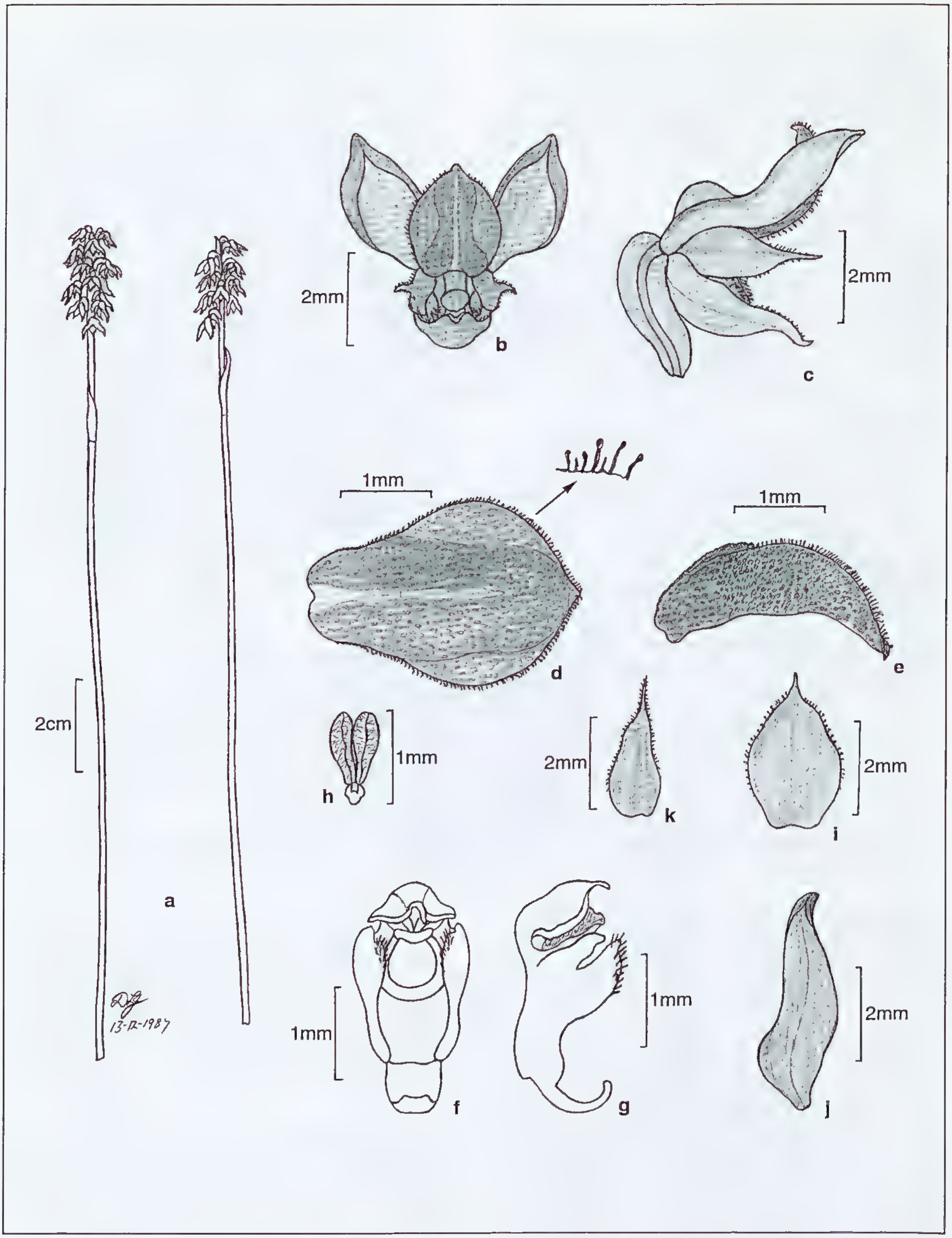
Spring-flowering midge orchid with porrect to semi-nodding, dark purplish black flowers with minute glandular cilia on the margins of the dorsal sepal, petals and labellum and a narrowly oblong-elliptic to narrowly oblong-obovate labellum.

Similar species

Genoplesium woollsii is an autumn-flowering species with similar-looking flowers to *G. vernalis,* but which have a broader, thicker labellum and coarser cilia on the dorsal sepal, petals and labellum.

Notes

This species is the subject of a recovery plan coordinated by the National Parks and Wildlife Service of New South Wales.



***Genoplesium vernalis*, East Lynne – New South Wales.**

(*D.L. Jones s.n. & M.A. Clements*) **Fig. 7.**

a. plants; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. column from front; **g**. column from side; **h**. pollinarium; **i**. dorsal sepal; **j**. lateral sepal; **k**. petal.

Drawing 13/12/1987 by D.L. Jones. ©

Conservation Status

Originally regarded as being endangered but recent field studies have shown it to be more much widely distributed and locally abundant than previously thought; a lesser conservation coding such as vulnerable is probably more accurate; conserved in Budawang National Park, Murramarang National Park and Morton National Park.

Etymology

From the Latin *vernalis,* pertaining to spring, in reference to the spring flowering habit of this species compared to *G. woollsii,* its autumnal congener.

Specimens examined

New South Wales. Kioloa State Forest, road to Pebbly Beach, 16 Nov. 1998, *Briggs 2786* (CANB); Kioloa State Forest, track off Maidens Road, 16 Nov. 1998, *Briggs 2787* (CANB); East Lynne, Kioloa State Forest, 18 Nov. 1995, *Jones & Jones (ORG656)* (CANB, MEL, NSW); North Brooman State Forest, 27 Nov. 2000, *Wright & Evans 181* (CANB); South Brooman State Forest, 27 Nov. 2000, Wright & Evans 182 (CANB); Flat Rock State Forest, 28 Nov. 2000, Wright & Evans 183 (CANB); Mogo State Forest, 28 Nov. 2000, Wright & Evans 186 (CANB); Budawang National Park, 28 Nov. 2000, Wright & Evans 187 (CANB); Boyne State Forest, 1 Dec. 2000, *Wright & Evans 189* (CANB).

Acknowledgements

I thank Barbara Jones for company in the field and Corinna Broers, Karina FitzGerald and Marion Garratt for technical assistance. Various people have assisted with specimens and localities including Boris and Peter Branwhite, Ron Tunstall, the late Paul Barnett, the late Tony Bishop, John Briggs, Everett Foster, Jeff Jeanes, Denzel Murfet, John Riley, Dean Rouse, Lyn Walsh, Genevieve Wright and Brian Whitehead. Jo Palmer and Brendan Lepschi commented on the manuscript. Alex George and Laurie Adams furnished the Latin diagnoses.

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Some Tips on Growing *Sarcochilus*

Frances Wilde
c/- P.O. Little River, Victoria 3211

My husband Eric and I live at a little village called Little River - on the Plains of Iramoo. It's about ten minutes on the west side of Werribee and just at the foot of the You Yangs National Park, Victoria. The weather patterns are quite hostile for orchid growing, going from minus 5C to 40C plus. Sometimes I think the wind starts and finishes here. On occasions it blows for days on end and when the weather bureau says, "gale force winds are expected", I know what they mean.

I would have preferred to have an area in which to grow my *Sarcochilus* that was covered in shadecloth on the sides, perhaps with a fibreglass roof for some protection, like we did in the suburbs, but we tried that when we first shifted down here, putting our plants in a shadehouse as a temporary measure.

In those days we had mostly cymbidiums and Australian native dendrobiums and just a few *Sarcochilus*. We were both working at that time and each night when we came home there was a lot of repotting to do as the pots had all blown over during the day.

In the suburbs, the neighbours fence gives you some protection, and some of the trees may cause too much shade, but found when we came down here we had to learn all over again how to grow our orchids, as we were on ten acres of open land, no trees and only post and wire fences.

This led to Eric (the carpenter in the family) building a strong orchid house to Category two specifications, which was covered in fibreglass - both walls and roof, which we lined with shadecloth. Surprisingly enough, this shed soon became too small for our collection and a duplicate was made with a gap of similar size in-between the two.

These sheds with windows and doors each end - North and South, housed all our cooler growing orchids, are kept open during the days for good ventilation and are able to be closed up if necessary at night, with fans running continuously in this area.

Not too many years went by and the gap between the sheds was covered over and our cooler growing orchid collection expanded when I became really caught up in growing *Sarcochilus*. Today after many ongoing alterations to our cultivation, I feel we have conquered the weather and are growing *Sarcochilus* with moderate success and have built up quite a large collection of these delightful little plants, which I purchase by flask, if I think the cross has potential.

Of course we don't know how they are going to flower - whether they will be show stoppers or just also-rans, as was the case when I purchased a dozen plants of a seedling *S.* Judith x Fitzhart (now registered as *S.* Burgundy on Ice) a few years ago from Down Under Native Orchids. Who in their wildest dreams would have seen the potential this cross was to have - personally I thought they would be good shaped, strong growing white "Sarcs".

These have been the 'flavour of the month' since this cross has started to flower, with just cause, as some of the colour that has come from this cross has been amazing. Out of the dozen I purchased, I have two that are mostly red, one with red blotches on white, and the rest are white with varying degrees of red in the centre, but I have found my white flowering *S.* Burgundy on Ice have longer spikes and more flowers per spike than the highly coloured ones. They are all extremely strong growing plants, and I wish I had purchased more (don't we all).

Some of my favourite "Sarcs" are the ones with *S. hirticalcar* in the breeding, like *S.* Riverdene, *S.* Flirt, *S.* Cherry Cheer, they usually flower twice a year for me, so there is always something out in the orchid shed.

I acquired *S.* Riverdene from Ken Russell of Dungog and it flowered in June 1995. That particular year the weather had been quite cold during the autumn when the spike had been developing on this plant and when the flower opened I was very surprised to find the colour was reversed to that of its normal flowering, which was cream with tan markings on each petal. On all flowerings since that time, this plants colour has varied with the weather. If the spike is developing in the warmer weather, the flower will be a creamy colour with tan stripes, and if developing during the colder weather the colour will be tan with very little cream, other than a fine line through each petal. This strain of *S.* Riverdene is quite different from the clones 'Holly' and 'Dolly', which flower creamy/green with varying amounts of red in the centre.

I also bought three seedlings of *S.* Flirt (Riverdene x *hartmannii*), only one of these has flowered so far, all three have struggled to grow, some say it is because they have *S. hartmannii* 'Yellow Snow' AD/ANOS as one parent. The one that has flowered has a very heavy substance to it, but as these plants are growing very poorly have just put all three into Sphagnum Moss to try to keep them growing. Isn't it always the way though, when you finally get something that is (in my opinion) outstanding, something always goes wrong.

The other little *S.* (Frances x Riverdene) x *hartmannii* flowered for the first time last year. It stayed out for weeks and if it keeps growing, as it has to date, will develop into a very nice plant - perhaps the extra dose of *S. hartmannii* has given it strength.

Not all my "Sarcs" have colour, I have quite a big collection of whites, one of which is *S.* Judith 'Snowball' HCC/AOC-VOC, this has grown into a very big plant and I am still trying to come to terms with dividing it. I have it in a 15" squat pot and it is getting too heavy for me to handle, but when autumn comes I think it might get the chop.

Another big plant is a *S.* Melba, which was one of the first *Sarcochilus* I purchased. It was after I saw this Melba flower for the first time I became hooked on a 'path of no return' and have been poor ever since. Although by today's standards the shape of this Melba is very open, it makes up for it in the number of spikes and flowers it has. I potted it into a big treefern pot about 10 or more years ago and every year at repotting time it is turned over on the side and some of the old bark removed and replaced with new, it is then given a drench with lime water. It is growing very well, although I have heard the tree fern may have adverse effects on it, to date I have not had a problem.

Another that I have in a tree fern pot is *Sarcochilus aequalis*, previously well known as the "southern form" of *S. hartmannii*. This is a big plant that has had many growths removed over the past decade or so and has just recently received a cultural certificate. It gets the same treatment with regards to renewing the bark and lime water drenching each year.

Another of my favourites is my collection of *Sarcochilus ceciliae*. These grow in pots on a shelf on the northern end of the shed, right under an open window, where they get more heat through the walls of the shed which they seem to appreciate and being under the window get quite a good air flow over them.

It is no good me telling you how you should grow your *Sarcochilus*. Our conditions are very different from the grower who has a small back yard with neighbours fences and trees to help shelter your plants.

But two things we have done to help overcome the heat and dryness down here is firstly purchased two second-hand water-filled air coolers and installed them in each end of the shed, and secondly installed a Moss misting system on the northern end to catch the hot northerlies as they come through the shed. Both have been invaluable to our growing conditions, the temperature has dropped considerably, and the humidity has been raised, so try it if you think your conditions are similar to that of ours. ✿

A New Subspecies of *Bulbophyllum weinthalii* R.S.Rogers (Orchidaceae)

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Abstract

Bulbophyllum weinthalii subsp. *striatum* from Queensland is described as new.

Key Words

Orchidaceae, *Bulbophyllum weinthalii* subsp. *weinthalii*, *Bulbophyllum weinthalii* subsp. *striatum*, new subspecies, Queensland, Australian flora.

Introduction

Bulbophyllum weinthalii is a very distinctive and unique Australian epiphyte, which is restricted to a single host species, namely the Hoop Pine *Araucaria cunninghamii* Ait. This orchid is rarely encountered in the wild and is poorly represented in herbaria.

It first came to scientific notice when Dr R.S.Rogers described it as new in 1933, after having been brought to his attention the previous year by F.A.Weinthal. Weinthal had plants in cultivation that were originally collected from Dorrigo in northern New South Wales. Remarkably in the original paper Rogers inferred a relationship between his new species and *B. baileyi* F.Muell. and even noted "It has been suggested that the plant under consideration is the southerly representative of the Queensland species, but the distinctions enunciated seem sufficient to dispose of this theory (Rogers 1933)".

The notion of a relationship between *B. weinthalii* and *B. baileyi* probably arose from similarities in the general shape, texture, colouration and markings on the flowers of each. *Bulbophyllum baileyi* is placed in section *Stenochilus* (Dockrill 1992) but the placement of *B. weinthalii* is unclear. Dockrill includes it in section *Sestochilus* but Vermuelen (1993) treats this section as a synonym of section *Stenochilus*. *Bulbophyllum weinthalii* has a growth habit similar to many species of section *Adelopetalum* but does not fit comfortably there and further research is needed to determine its relationships. Molecular studies into this whole genus should provide interesting results.

Bulbophyllum weinthalii is keenly sought after by orchid growers because of its large and interesting flowers. Plants were freely available from specialist orchid nurseries in the 1950's and 1960's when stands of Hoop Pines were being logged, but it is rarely sold today. In general it is regarded as being difficult to maintain in cultivation, especially by growers around Sydney. The introduction of a variant from the northern parts of its range aroused interest when it proved to be quite amenable to cultivation. This aspect combined with a predominance of striate floral markings suggested that it is worthy of taxonomic recognition.

Taxonomy

Epiphyte forming dense clumps. Pseudobulbs densely crowded, ovoid to conical, 10-20 mm long, 8-15 mm wide, wrinkled, narrowed to a short, slender apex, when young covered with white lanose bracts. Leaf solitary, terminal, oblong-lanceolate to elliptic-lanceolate, 15-30 mm long, 5-10 mm wide, slightly twisted at the base, thin-textured but tough, dark green adaxially with a shallowly sunken mid-vein, paler abaxially with a shallowly ridged midvein, apex acute to apiculate. Fertile bracts 2, tubular, c. 5 mm long, c. 3.5 mm wide, imbricate, sheathing the base of the pedicel. Pedicel 11-13 mm long, weak, twisted distally. Ovary obovoid, c. 4 mm long, c. 2 mm wide. Flower solitary, 18-24 mm diam., porrect to semi-pendent, opening widely, thick, fleshy, waxy, white cream or greenish with mauve, dark red or reddish-purple dots, blotches and/or striae (rarely wholly coloured); labellum greenish to reddish purple. Dorsal sepal porrect to obliquely erect, oblong-ovate to oblong-elliptic, 8-11 mm long, 3-5 mm wide, 5 veins prominent, apex acute. Lateral sepals spreading widely, more or less assymetrically triangular, 9-11 mm long, 9-11 mm wide at the base, apex acute. Petals porrect, oblong to slightly obovate, 6-8 mm long, 2-3 mm wide, obtuse. Labellum hinged by a short thin claw to the apex of the column foot; lamina fleshy, c. oblong when flattened, 9-11 mm long, 5-6 mm wide, erect in the proximal third to half then abruptly curved forwards with the distal half protruding from the flower, broadly channelled in the proximal half, each channel margin ending in a broad ridge or keel. Column at right angles to the end of the ovary, 4-5 mm long, 3-4 mm wide, broadest towards the base. Anther cap ovate-trapezoid, c. 1 mm long, c. 1 mm wide, with a decurved rostrum. Pollinia 4 in 2 closely apressed unequal pairs, orange, waxy, each pair c. 1 mm long, 0.7 mm wide. Rostellum crescentic, c. 1 mm long. Stigma sunken, ovate-elliptic, c. 1.5 mm long, c. 1.5 mm wide, the margins bordered with red. Column foot at 70-80° to the column, 8-10 mm long, 3-4 mm wide, narrowed and incurved distally. Capsules broadly elliptic, c. 12-15 mm long, c. 8 mm wide, green, ridged.

Two subspecies are recognised.

1. ***Bulbophyllum weinthalii*** R.S.Rogers **subsp. *weinthalii*,** *Trans. & Proc: Roy. Soc. South Australia* 57: 95-96 (1933). Type: New South Wales, cult. 5 Apr. 1932 ex Dorrigo, Sep. 1931, *F.A.Weinthal* (holo AD!).

Illustrations: Plate 431, Nicholls (1969); page 522 Jones (1988), ex Kyogle, NSW; plate 469 Bishop (1996).

Distribution and Ecology

Of very disjunct distribution and scattered on high peaks between the Bunya Mountains near Toowoomba in southern Queensland and Dorrigo in north-eastern New South Wales. Found only on large hoop pines which occur at moderate to high altitudes in the ranges and tablelands. The orchid plants grow on the larger branches and upper parts of the trunk with their roots gaining purchase in the rough scaly bark of the host. They are often locally common and plants can be frequently found on fallen branches. Altitude: c. 800-1200 m. Flowering period: March to May.

Notes

This subspecies is characterised by flowers with dotted or blotched segments, which lack distinct striae. Its flowers exude a strong semen-like scent that attracts blowflies for pollination purposes (Jones 1985).

Specimen examined

New South Wales: Cult. ANBG ex Moonpah State Forest, Dorrigo, 28 Mar. 1984, *Taylor 2376* (CANB).

2. ***Bulbophyllum weinthalii*** R.S.Rogers **subsp. *striatum*** D.L.Jones, **subsp. nov.**, subsp. *weinthalii* affinis, sed floribus majoribus; et tepalibus latioribus striis linearibus praecipue ornatis, differt.

Typus: Queensland. Cultivated by G.Walsh ex Calliope Range, 6 Sep. 1993, *ORG 1740* (holo CANB).

As for subsp. *weinthalii* but with slightly larger flowers, broader perianth segments and many of the perianth markings are in the form of striae.

Illustrations: This paper.

Distribution and Ecology

Apparently restricted to the Dawes Range and Kroombit Tops in the Calliope Range near Bundaberg, Queensland, where locally frequent on large *Araucaria cunninghamii* growing on the higher parts of the ranges. Altitude: 650-930 m. Flowering period: March to June.

Notes

This disjunct northern subspecies, which is separated from populations of subspecies *weinthalii* by about 300 km, has slightly larger flowers than subspecies *weinthalii* with broader perianth segments on which many of the markings form striae rather than blotches. As many orchid growers in Sydney have found that it adapts to cultivation much more readily than the typical subspecies (David Banks pers. comm.), it may have some differences at genetic level.

Specimens examined

Queensland: cult. M.Harrison ex Kroombit Tops, 20 June 2000 (ORG 3050) (CANB); *ibid*, 20 June 2000 (ORG 3051) (CANB);

Acknowledgements

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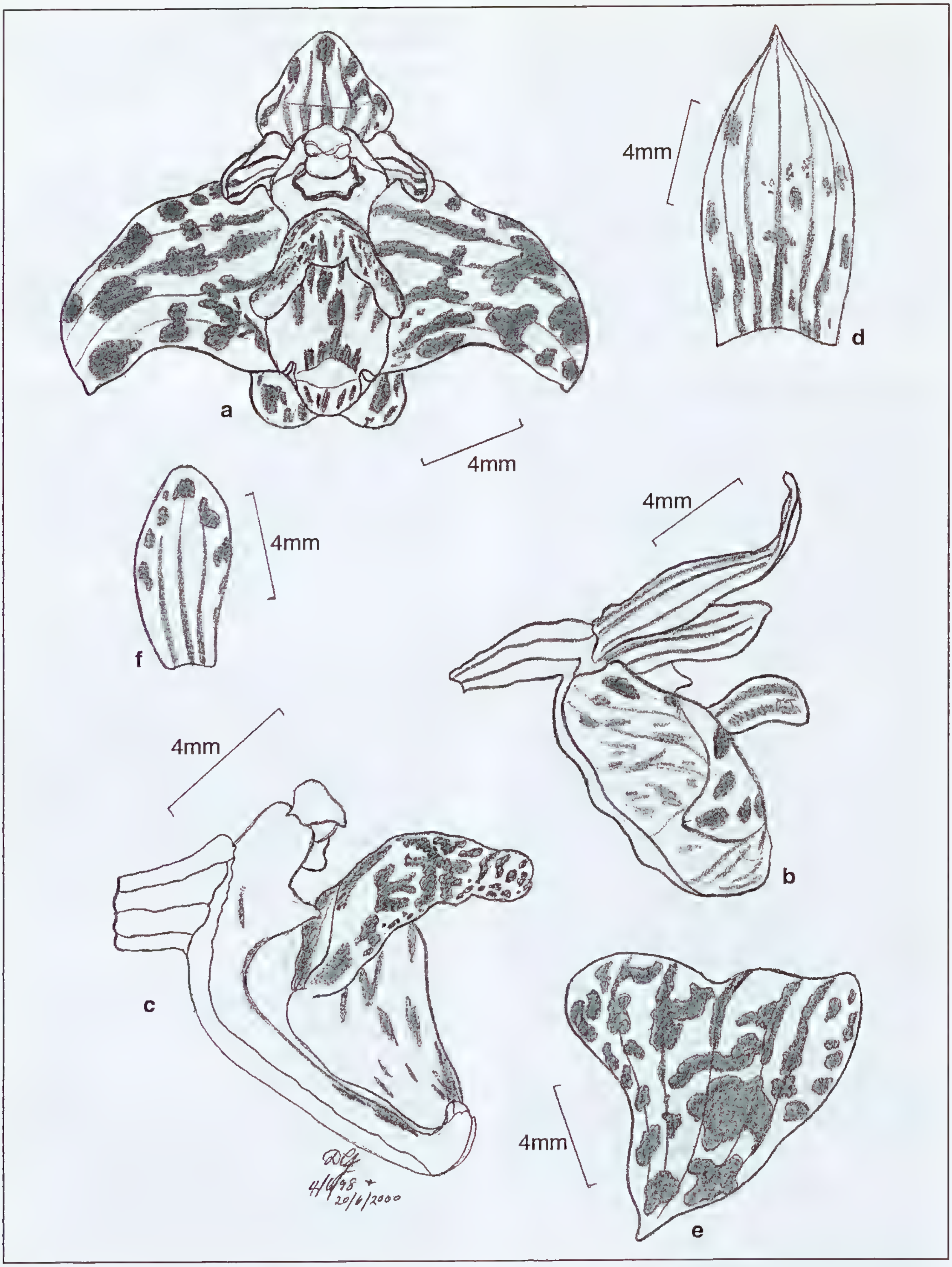

Bulbophyllum weinthalii subsp. striatum, **Kroombit Tops, Qld.**

(*G.Walsh*)

a. flower from front; **b**. flower from side; **c**. column and labellum from side;
d. dorsal sepal; **e**. lateral sepal; **f**. petal.

Drawing 4/6/1998 & 20/6/2000 by D.L. Jones. ©

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Orchids of the Anglesea District - Conservation Problems

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For as many years as can be remembered, visitors, including interstate and overseas, have been attracted to Anglesea to admire the amazing number of orchids which grow in the area in a variety of habitats. Just over 100 species have been recorded, including rare and endangered species and also one that is endemic to Anglesea. Habitats include grasslands, heathlands, coastal heathlands, light forest, swamplands and sandy areas.

During recent years many of the orchids have been under severe pressure as a result of various factors including inappropriate housing subdivision, lack of knowledge and consultation by statutory bodies, incorrect use of the area by off-road vehicles and horse riders, careless use of the tracks by bush walkers, and also by the illegal collecting of specimens.

For about 50 years the O'Donhue family had owned a large area of heathland with a long frontage to the Great Ocean Road. A proposal was made that this area be subdivided for housing and the building of a holiday resort, which caused loud protests as the area is significant for many plants, and a number of orchids. An appeal was heard by the Administrative Appeals Tribunal, who subsequently allowed two areas to be subdivided for housing, with the bulk of the area added to the Lorne-Angahook State Park. Although a number of orchid colonies were lost to this decision, most of the orchid habitats were preserved. Records show that 40 orchid species are retained in the area; some of these are of great importance to Anglesea, *Caladenia filamentosa, C. iridescens, C. oenochila, Corybas unguiculatus, Pterostylis* sp. aff. *alata*, and *P. tasmanica.* The only known colony of the newly described *Caladenia maritima* is located here and *Thelymitra* sp. aff. *pauciflora* (Anglesea) is not found in other areas. *Genoplesium despectans* has never been widespread around Anglesea and is now feared to be extinct in the area, as the last known colony was build over two years ago.

Thelymitra merraniae was first found at Moggs Creek in 1929, but over recent years appeared to be a forgotten species. Margaret MacDonald and her late sister, Kath Morgan, started searching for this orchid. After a number of frustrations, when they only saw *T. ixioides*, *T. merraniae* was rediscovered in 1992 - in an area where they did not expect to find it. Shortly after this, an application was made to subdivide part of the area for housing. The Appeals Tribunal allowed the subdivision, but ruled that a small reserve be retained. This reserve was not fenced and has been subjected to many vehicles using the area, which has caused the soil to be severely compacted. Although the reserve is now blocked off, it is not known if the orchids will re-appear. Only time will tell.

Some three years ago, Surfcoast Shire proposed selling building blocks at Aireys Inlet. As this area contained significant orchid colonies, protests were made by various organisations, including ANOS Geelong. The Shire agreed to a meeting on the site between its Officers and members of the groups, where it was agreed that the corner of the area should be set aside as a roadside reserve. This reserve is named 'Greenhood Reserve' because of the number of *Pterostylis* species that grow there. It was with dismay and disbelief that a recent visit revealed extensive damage to the reserve, caused by vehicles being driven over the area - flattening most of the orchid colonies. The Shire has now been approached with the view of fencing the reserve and also having it signposted. The *Pterostylis* species that grow on the reserve are, *P. curta, P. concinna, P. nana, P. nutans, P. melagramma, P. pedunculata* and *P. revoluta*. Other orchids recorded are *Acianthus pusillus, Cyrtostylis reniformis, Corybas incurvus, Dipodium roseum* and *Leptoceras menziesii*. The *Pterostylis concinna* population in this reserve is of high importance for Anglesea, as most other colonies have been destroyed by development.

In May of this year, several marker posts appeared along a roadside verge that contains many orchids. Enquiries gained the fact that the Water Board was to install a new water main, with these posts showing the route to be taken. After protests to the Shire and Water Board, a meeting was held on site, when it was agreed the new main would be relocated to follow the route of the old main, saving the orchid sites from destruction. It is interesting to note that the Water Board has recently formed an Environment Consultative Committee of 8 members from interested groups. I have been invited to be one of these committee members.

Trail bike riders are a continual problem, as they do not keep to the tracks, creating fresh trails in new areas. Recently a group rode over a colony of *Caleana major, C. minor* and *Corybas unguiculatus*, ignoring a sign to keep off the area. Upon being advised of this, Alcoa quickly blocked off the area to prevent further intrusion.

Four-wheel drives are also a problem on the narrow tracks, as they are driven close to the edges. A large number of *Chiloglottis reflexa* have been lost because these vehicles have caused considerable widening to the side of the track where they grew. There does not seem to be a solution to this problem.

Although horse riding is banned on Ted's Ridge Track, many riders still use this track, gradually encroaching onto a colony of *Thelymitra matthewsii*. Making a new track, away from the colony, and also blocking off the old track, solved this problem. A low protective fence was also placed around the colony. This year, eleven of the spiral leaves have been seen, with four of these producing buds. Other orchids on this track include *Acianthus caudatus, A. pusillus, Corybas incurvus, C. unguiculatus, Cyrtostylis reniformis, Pterostylis melagramma, P. nana, P. plumosa, Pyrorchis nigricans, Thelymitra ixioides* and *T. pauciflora*.

The concern of Margaret MacDonald and myself about the continual reduction of orchid habitats plus the fact that many of the orchids are therefore becoming rarer and even facing extinction, led to the production of our book *Orchids of the Anglesea District*. Our hope is that this book will alert people to the fact that most orchid species are decreasing in number, and encourage the active support of conservation programmes to help preserve all remaining orchid habitats. We have been pleased with the support our book has so far received, which is still available from the above address.

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New Caledonia and its Dendrobiums (Part 1)

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New Caledonia is a rolling, medium-sized subtropical island with nearby smaller islands, whose attractive but undramatic appearance belies its extraordinary history, rocks, and plants. Its primitive endemic flora and unusual geology have long excited both botanists and geologists. In the words of a botanist (Thorne 1963, p. 326), "probably no richer nor more peculiar, archaic, and endemic relict seed-plant flora can be found elsewhere compressed into such a small area." In plant species endemicity, New Caledonia (over 80%) compares with Hawaii (over 90%), Madagascar (about 90%), and New Guinea (about 85%). These islands and archipelagos obviously have very diverse histories and geographical situations. Because New Caledonia and New Guinea are the only islands with endemic sections in *Dendrobium,* I shall compare them specifically. In this paper, I shall use the lower-case "dendrobium" to refer to the whole subtribe.

Location and description of the island

New Caledonia lies between 20° and 22° south latitude, just north of the Tropic of Capricorn. Hence it is cooler than the more northerly islands of Oceania. Since we shall be considering large-scale movements of lands and plants, the present distances between New Caledonia and its neighbours are relevant. It is approximately 1500 km (900 mi) east of Australia, 1200 km (750 mi) west of Fiji, 500 km (300 mi) south of Vanuatu, 700 km (400 mi) north of Norfolk Island, and 1700 km (1000 mi) north of New Zealand.

Holloway (1979), in a monograph on the moths of New Caledonia, provided a thorough review of its geography, tectonic history, and flora. Lowry (1991) and Aitchison et al (1995) summarised more recent research. Saudeau et al (1989) have produced a compact illustrated guide. La Grande Terre ("the Big Land") is 390 km (250 mi) long and about 50 km (30 mi) wide, with a central spine of mountains rising to 1600 m (5300 ft).

Small islands considered part of New Caledonia are the Isle of Pines, an offshore fragment to the southeast; the young volcanic Loyalty Islands 200 km (120 mi) to the northeast; and some small islands off the northwest coast. Coral reefs and islets fringe La Grande Terre, which will be our focus. Lying northwest to southeast, just within the tropic zone, it is subtropical and moist, with the greatest rainfall on its northeast slope, obliquely facing the trade winds. Rainforests grow on each of the two fundamental soil types, which we shall discuss below.

Uniqueness of New Caledonia flora

New Caledonia supports a very large number of plant species, including dendrobiums, relative to its size. There are several possible reasons for this: it was once larger, so that it may have undergone a concentration of relictual species (Carlquist 1974); it contains two different floras growing on different substrates; and it has both ancient relicts and evolving immigrants of Australian and New Guinean origin. Having retained an equable subtropical climate, it is a refuge for some of the original flora lost from Australia, which has endured cycles of warmth and aridity, and New Zealand, which has undergone volcanism, cooling, and recent glaciation. The New Caledonian flora includes 5 endemic families and 6 of the 11 genera of vesselless angiosperms, the most primitive flowering plants. Indeed, endemic *Amborella is* thought to be the most primitive of all known angiosperms (Milius 1999).

The following figures from Thorne (1965) show the geographical affinities of the flora. New Caledonia shares 38% of its genera with Vanuatu, 38% with Fiji, 33% with Queensland, 33% with the Solomons, 32% with New Guinea, 14% with Tasmania, and 13% with New Zealand. This profile of overlapping distributions results from (1) the dual sources of the New Caledonian flora, Australia and New Guinea; (2) the Solomons-to-Vanuatu island "corridor" from New Guinea, also called the Melanesian Arc; and (3) the peripheral positions and relatively cold climates of New Zealand and Tasmania.

Notable for our study is the presence in New Caledonia of several ancient trees, especially the "southern beech," *Nothofagus,* and the primitive conifer, *Araucaria,* both of which are favoured hosts for epiphytic dendrobiums. Their present distribution, which includes southern South America, marks these trees as natives of the great southern continent, Gondwana, which split up piecemeal, beginning about 100 million years ago (mya). As we shall see, this event is crucial in the history of the orchids of Australia and New Caledonia. The presence of such plants as *Nothofagus* and *Araucaria,* whose seeds do not spread readily across water, indicates that the island was once continuous with Australia.

The ultramafic soil and its flora

The undulating low mountain chain, which dominates the topography of New Caledonia, wears in many places a cap of ophiolite, a geological formation containing minerals toxic to most plants. Ophiolite is actually a layered carpet of sea bottom thrust up over the land as a complication of plate subduction. (How much of this process occurred underwater in New Caledonia is unclear.)

By 38 million years ago (mya) this crust, 2 km (nearly 7000 ft) thick, blanketed the entire present island. Reduced and fragmented by erosion, it still covers one-third of the surface. Most of the persisting ophiolite occurs as a massif occupying the southeastern third of La Grande Terre, but smaller areas dot the island.

Constituent minerals of certain layers of the ophiolite, peridotite and its product, serpentine rock, deteriorate with weathering into a granular, porous soil, called "ultrabasic" or "ultramafic," which is poisonous to most plants. The term, "basic," here refers to metals; "mafic" denotes a combination of magnesium and iron. Serpentine, largely composed of magnesium silicate, contains a number of trace elements. It is relatively high in magnesium, nickel, iron, and chromium; but low in calcium, potassium, and phosphorus (Brooks 1987). Its chief chemical hazards for plants, in addition to rapid drainage and general infertility, probably include low calcium availability as well as nickel and magnesium toxicity. The abnormal ratio of calcium to magnesium is a key factor.

The names, "ophiolite" and "serpentine," both referring to snakes, allude to the greenish surface of serpentine, which reminded geologists of snakeskin.

On this unfavourable substrate there always grows a characteristic mineral-tolerant flora, quite distinct from that of the surrounding area, although some plants cross over. Plants on serpentine tend to be sparse, dwarfed, with succulent or hard (sclerophyll) leaves. (Indoor gardeners know that succulent plants resist not only dehydration, but also mineral buildup in the pot.) *Nothofagus* and *Araucaria* grow on both soil types. It has been suggested that the latter, in particular, is a favoured host for epiphytes on serpentine because it towers far above its shrubby surroundings.

Ophiolite masses large enough to affect the dendrobium distribution also exist on Mt. Kinabalu in Borneo. Other significant deposits within the dendrobium range, largely unstudied, are in New Guinea, Sulawesi (Celebes), Halmahera in the northern Moluccas, and Palawan in the Philippines. Generally similar but smaller serpentine "barrens" occur at old plate boundaries in many parts of the world, including my neighbourhood in Pennsylvania. We shall consider the development of the New Caledonia ophiolite and its dendrobiums below.

New Caledonia has the world's richest and most varied serpentine vegetation. On about 80% of its area this appears as an impoverished shrubby association, known as *maquis,* with most of the remainder being rainforest. Herbs, including ferns, generally replace grasses. On this substrate are concentrated plants of Australian origin, for reasons we shall consider below. The residents of the ultramafics are over 90% endemic to the island, and two-thirds of them are restricted to the serpentine. A notable feature of this flora is an evolutionary radiation of terrestrial *Dendrobium* species in the endemic section *Macrocladium.* These species prosper on the ultramafics, alongside the primitive orchid tribe Diurideae, despite the fact that fungi, necessary for the nourishment of orchid seedlings in the wild, are scarce in mineralised soils (Brooks 1987, p. 53). The Diurideae, which include most of the ground orchids of both New

Caledonia and Australia, have a few species in Asia and also in Chile, a distribution revealing their Gondwanan origin. Like other Australian plants, the ancestral Diurideae adjusted to the increasingly dry and infertile soils of the continent. This may have given them some advantage on the New Caledonia ultramafics. Possibly the normally epiphytic lifestyle of the dendrobiums, which requires a tolerance for water and mineral deficits, preadapted section *Macrocladium* for terrestrial life on the island. (Succulent houseplants resist toxic mineral buildup in the pot.) Both orchid groups now populate the ultramafic areas, where they have less competition from "ordinary" plants.

Epiphytic dendrobiums in the closely related small section *Kinetochilus* (3 species) are also endemic to the ultramafics, despite the probability that their dependence on the soil type would be much reduced. These species, though none is restricted to a single host (MacKee pers. comm. 1994), favour the ancient trees that tolerate or seem to prefer the ultramafics. One of these, *Araucaria,* noted above, has approximately twelve species in New Caledonia, far more than elsewhere. These trees and their dendrobiums, as well as the terrestrial orchids, may have speciated on eroded patchy "islands" of ophiolite. Why tree-dwelling plants should prefer this substrate is unclear. Perhaps their insect pollinators visit other flowering plants in the same association. Perhaps the epiphytes prefer the more open cover of the *maquis* and the ultramafic *Araucaria* forest.

On Mt. Kinabalu in Borneo, with different hosts, some spectacular epiphytic dendrobiums are endemic to ultramafics. Bark chemistry of the phorophyte (host) tree, being obviously influenced by the substrate, must be crucial for both epiphytic seedlings and their fungal symbionts.

Tectonic history; origin and distribution of the Dendrobiinae

To trace the origin of the island's unusual rocks and plants, we begin before the opening of the Tasman Sea. During most of the Cretaceous period (145 to 65 mya) Australia was attached to Antarctica as part of the great southern continent, Gondwana, and the Australian portion extended much farther east. In the north, the now sunken Queensland Plateau adjoined Cape York. Farther south lay a large area, which later became the Lord Howe Rise and Norfolk Ridge. The latter is the site of origin of New Caledonia. During the Cretaceous, *Nothofagus* and primitive conifers forested Australian Gondwana (White 1985).

In this habitat, I believe, the ancestral Dendrobiinae evolved from South American epidendroid ancestors (Wood 1998). The rationale for this idea, suggested by Dressler (1993), is as follows. The orchids, like other flowering plants, probably originated somewhere near the present mouth of the Congo River, an inland area when Africa and South America were joined as parts of Gondwana. The gradual split must have left some orchids in Africa, others in South America. Among the epiphytic epidendroids it is the reed-stemmed Epidendreae, though characteristic of South America, which seem to have given rise to the Dendrobiinae (Dressler 1993).

Thus, as the continents separated, ancestors of the Dendrobiinae probably spread south through South America into Antarctic, and thence Australian, Gondwana. Stronger evidence suggests that some of these dendrobium forebears rafted north on the subcontinent of India, which broke away from Australian Gondwana over 100 mya; moved north slowly at first, later rapidly; and collided with Asia about 50 mya. This South America-Antarctica-Australia-India path of spread seems more plausible for the Dendrobiinae than a route across Africa. Furthermore, that continent has sustained much drought and volcanism, and no evidence of putative ancestral epidendroids survives there. Nevertheless, *Bulbophyllum,* a more highly specialized, fly-pollinated cousin of the Dendrobiinae, appears not only throughout the dendrobium range, but also in Africa, Madagascar, and tropical America.

In postulating northern and southern clades of the Dendrobiinae, which are validated by DNA studies (Yukawa et al 1993), I follow Breiger (1981), Rentoul (1982), and later authors (Adams 1990, Lawler 1995). We suggest that while the ancestors of the northern clade left

Australian Gondwana on the Indian subcontinent and rode north to Asia, evolving in the process, the southern clade developed in forested Australia. For a theory of the further history of the northern clade, see Wood (1998).

Lavarack and Harris (1996) have presented a different view. They propose that only the Diurideae are indigenous to Australia; that the Dendrobiinae all descend from the Indian population; and that some of them later moved south from Asia, through Sundaland (Malaysia/Indonesia) to New Guinea, Australia, and the Pacific islands. The theory I advocate, however, allows us to infer that the earliest New Caledonian dendrobiums (along with the Diurideae and probably other orchids) derived, like the Indian species, from Australian ancestors isolated by rifting.

Formation of New Caledonia and origin of its early flora

About 80 mya a rift developed between New Zealand and Antarctica, running westward, then northward, where it widened become the Tasman Sea. Thus it detached from Australia a fragment, called Tasmantis (Coleman 1980), which included the present Lord Howe Rise and Norfolk Ridge. The Lord Howe Rise is currently submerged except for Lord Howe Island and, at its north end, the rocks and strands of the Chesterfield Reefs. The Norfolk Ridge includes the present New Caledonia, Norfolk Island, and New Zealand, as well as the now submerged Campbell Plateau southeast of New Zealand, and probably part of Fiji.

Tasmantis gradually drifted north, so that New Caledonia reached its present position about 60 mya. Subsequently, an abortive event of seafloor spreading, the New Caledonia Basin, incompletely divided the two ridges from the north. Meanwhile, collision with an island arc located on the west-moving Pacific Plate to the east, which was subducting beneath Tasmantis, caused upheaval, including volcanism, in New Caledonia, located along the eastern margin of the Tasmantis microplate. As part of this process, the blanket of ophiolite overrode the island until, about 40 mya, it had covered the native rocks. The subduction zone subsequently reversed direction and shifted further to the east, where the continuing plunge of Tasmantis under the Pacific Plate has produced the volcanic islands of Vanuatu. Meanwhile no further volcanic activity has disturbed La Grande Terre. As noted above, its stable climate has helped preserve its primitive life forms.

Australia itself had begun to separate from Antarctica about 90 mya, before the Tasman Sea rifting, but did not move northward into drier climes until about 40 mya, or later, by which time decoupled New Caledonia had reached its present position.

In New Caledonia, native plants that could tolerate or adapt to the ultramafics survived, but relatively few later immigrants succeeded on this unfriendly terrain (Morat, Jaffré, Veillon, and MacKee 1986; Morat, Veillon, and MacKee 1984, 1986; Jaffré et al. 1987). In time the two ridges largely subsided below the sea, leaving the isolated islands of today. Meanwhile the ophiolite cap on New Caledonia was eroding, uncovering underlying "normal" rocks and allowing soils to develop which were more suitable for immigrant plants from the north or for refugees from the encroaching ophiolite.

Although, as noted above, the early radiation of dendrobiums in New Caledonia presumably occurred on the ultramafics, many primitive genera (orchids and others), as well as recent immigrants, inhabit the areas of "normal" soils derived from limestones, shales, metamorphics, and volcanics. Some species grow on both substrates. Thus two significantly, but not entirely, different floras grow alongside each other.

New Caledonian orchids and their sources

In New Caledonia, according to a recent count (Bégaud et al 1995), live 203 described species of orchids, about half endemic, with 5 endemic genera. Hallé earlier (1981) recorded 196 species, about two-thirds endemic, in 71 genera, 5 endemic. This high endemicity compares with only 7 endemics (about 4%) among 158 species on the young neighbouring "corridor" archipelago of Vanuatu. *Dendrobium*, in its traditional broad sense, is the fourth largest plant genus on New Caledonia (Good 1974).

Of the 5 generally accepted endemic orchid genera of New Caledonia, all terrestrial, 2 are in the southern (Gondwanan) Diurideae, 2 in the worldwide vining Vanillinae, and 1 in the worldwide Spiranthinae. Clements and Jones (see Taxonomic Revisions, which will be in the next issue) would raise the number of endemic genera to 9 by removing *Cannaeorchis, Kinetochilus, Inobulbon,* and *Tetrodon* from *Dendrobium.* Thus the largest genus has been, but may not always be, *Dendrobium* (40 species before and 14 after the above splits). Following this is the worldwide *Bulbophyllum* (16), Australia-related *Acianthus* in the Diurideae (14), and worldwide *Liparis* (12). The Vandeae, a worldwide tribe whose genera are finely divided, have been good colonizers, as usual: New Caledonia shares 7 of its 10 vandaceous genera with Australia, 7 with New Guinea, 6 with Vanuatu, and 8 with Fiji.

Thus the rich orchid flora of New Caledonia has multiple connections. There are basically two routes by which plants, including orchids, reached the island: from Australia directly or from New Guinea via the Melanesian island chain. I shall try to reconstruct this history for the Dendrobiinae.

To avoid confusion, I shall defer use or discussion of the Clements and Jones genera until the Taxonomic Revisions section (in June 2001 issue).

In the genus *Dendrobium,* interpreted broadly, we find the most unusual development among the orchids of New Caledonia: groups of endemics markedly different from any other species in the genus or the subtribe, some quite primitive in structure. As noted above, of the 37 species, 27, about 70%, are endemic. Some of these plants give us hints concerning the development of the genus, as we shall see below.

The Dendrobiinae of New Caledonia include *Diplocaulobium*, 2 species; *Flickingeria*, 1; and *Dendrobium*, 37 in at least 15 sections (Hallé 1977, 1986; MacKee pers comms 1993, 1994). Four of these sections are endemic and another has 1 species in Australia. We have seen, in the discussion of the ultramafics, how the tectonic and ecological history of the island helps explain the peculiar nature of its flora, including its dendrobiums.

Summarizing the scenario elaborated above, I propose that ancestral epiphytic and possibly terrestrial members of the Dendrobiinae populated the cool late Cretaceous forest, which covered Australia over 60 mya, including the future Tasmantis. The presence of multiple ancient, poorly-dispersing species in New Caledonia, such as *Araucaria* and *Nothofagus,* indicates that ancestors of many New Caledonian plants survived on Tasmantis during the long isolation and slow subsidence after the rift. They became sequestered on diminished New Caledonia, probably along with refugees from elsewhere within Tasmantis. For instance, the Chesterfield Reefs may once have been habitable islands and thus may have served as "stepping stones" for plants from Australia.

About 40 mya the encroaching ophiolite "blanket" challenged the immigrants and later protected those survivors, which could tolerate or adapt to it. These gradually produced new species and eventually new sections. Their degree of uniqueness testifies to their antiquity on the island.

With this background in mind, we can tentatively divide the New Caledonian dendrobiums into 3 groups: natives, early immigrants, and late immigrants.

Natives

These are endemic sections adapted to the ultramafics and their possible descendants.

We can infer from the above that among the plants colonising the ophiolite were the ancestors of the related endemic *Dendrobium* sections *Macrocladium* (11 species) and *Kinetochilus* (3 species). Lacking close relatives in Australia, probably because of extinction there, these remarkable plants are almost unknown to orchid growers overseas.

The members of *Dendrobium* section *Macrocladium* are large, branching terrestrials, which have been called orchid trees. They flourish among ferns in the low, relatively sparse *maquis,* relatively free of grasses. Their tall stature raises them above much of the shrubbery. Some of these dendrobiums are among the tallest of all non-vining orchids: *Dendrobium vandifolium* reaches 4 m (nearly 14 ft), and *D. deplanchei* 5 m (17 ft). Their vegetative habit, noted above, is primitive, with the branching stem slim and fully-leaved; the inflorescences are multiple, usually short, and lateral. The simple flowers have a tongue-shaped lip, sometimes frilled, and a decurved conical mentum. Except for *D. cymatoleguum,* the roots are verrucose. There is, however, much variety within the section. *D. verruciferum* has warty stem and small, slim leaves. This and several other species produce only one or two flowers per inflorescence. *D. vandifolium,* however, has massive folded leaves like those of a strap-leaved *Vanda,* cradling long inflorescences.

A possible Australian cousin of these plants is the endemic *Dendrobium agrostophyllum,* an atypical, primitive-looking member of the small section *Brevisaccata,* syn. *Trachyrhiza* (Ormerod 1997). This species has smooth roots (unique in the section), fully leafy stem, and few flowers with relatively simple labellum. The section has radiated in New Guinea and has 1 species in New Caledonia, *D. finetianum,* which resembles in several respects sections *Macrocladium* and *Kinetochilus.* Indeed, *D. finetianum* was originally listed in section *Macrocladium,* where Schlechter, in describing the species and the section, had hesitantly assigned it (Schlechter 1906). With rough roots and an elaborate lip, this plant resembles much more closely New Guinean and Fijian members of this section than *D. agrostophyllum.* Therefore I propose that it did not derive directly from Australia, but rather from New Guinea, and place it among the late immigrants, discussed below.

Dendrobium Section *Kinetochilus* is vegetatively simpler than section *Macrocladium;* this appears to be a secondary adaptation to tree living, since the flowers seem more evolved than those of section *Macrocladium.* The roots are smooth. The shorter, unbranched stems produce flowers with lip mobile, decurved, and carrying 3 high keels. *D. cleistogamum,* if its flower opens, reveals a lip decorated with two small, curved lateral horns. *D. pectinatum* is vegetatively distinctive, with short, slim leaves closely spaced as in a comb. It alone of the three has spread beyond the ultramafics.

After their initial evolutionary radiation, these two endemic sections, without further climatic or tectonic upheaval, probably remained very stable. Having adapted to a unique chemical environment, they seem unable to colonize islands with more ordinary soils and plants. A less likely possibility is that they have become "dedicated" to endemic pollinators, which probably would populate adjacent islands. In contrast, the terrestrial Diurideae have spread widely. This should not be surprising, since (unlike these dendrobiums) they are a very large and diverse group, able to inhabit varied habitats.

These relatively primitive dendrobiums may have produced modern descendents in New Caledonia. The best candidates are the other two endemic sections of *Dendrobium, Inobulbum* (Schlechter's original spelling, 1906) and *Tetrodon* (Ormerod 1996), with 2 species each. They are very distinctive, evidently closely related, and of unclear origin. They are also vegetatively advanced (actually reduced), with paired distal leathery leaves on short petioles (petioles are very unusual in the Dendrobiinae); short multisegmented pseudobulbs; and long branching lateral racemes. Section *Inobulbum* has persistent leaf veins, like bristles, decorating the fat, fusiform pseudobulbs. The stems of *Tetrodon* are ovoid and smooth. The elaborate crest of the lip, which in *D.* (*Tetrodon*) *petrophilum* resembles 4 teeth, probably suggested the sectional name. Hallé's drawings (1977) of *D.* (*Tetrodon*) *oppositifolium,* however, seem to show only 3 teeth. Although these features do not point to close relatives, the flower structure and rough roots recall the section *Macrocladium.*

Endemic *Dendrobium virotii* is unique and puzzling. It clambers over its host in a vining manner, achieved by a succession of distal branches or kiekies. The elaborate lip has a broad, heart-shaped epichile. This species does not fit into any of the usual sections and would seem to have no near relatives. Clements and Jones (1997b) plan to reclassify it.

Early immigrants

According to our scenario, over many millions of years, while the Tasman Sea opened and New Caledonia took its present form, dendrobiums and other plants colonized the island from Australia. As the overwater distance increased and Tasmantis shrank, migration decreased but did not cease altogether. In the early immigrant category I have placed endemic species of Australian origin, which must have had a long stay in New Caledonia. Only a few *Dendrobium* colonists qualify. Borderline cases are two species in section *Dendrocoryne*: *D. comptonii,* the Pacific variant of Australian *D. gracilicaule*; and the endemic *D. odontochilum* (closest to Australian *D. aemulum*?), which grows best as a lithophyte on serpentine rocks. Hallé (1977) illustrates two "forms" based on lip features, one of which may be a hybrid with *D. comptonii.* although we do not know when these species arrived in New Caledonia, we have hints. *D. odontochilum* required significant time to evolve morphologically while adapting to life on serpentine. *D. comptonii,* in contrast, appears more recent. It has remained epiphytic, closely similar to *D. gracilicaule.* It has spread unchanged, hence probably recently, to Fiji, Samoa, and even the Kermadec Islands to the southeast. Thus it appeared early enough to have travelled widely across vast seas, and late enough to have changed little. Indeed some taxonomists (Kores 1989 and 1991; Lewis and Cribb 1989) have not accepted *D. comptonii* as a separate species. Both *D. comptonii* and *D. odontochilum* can be found in trees on both soil types. *D.* (*Rhizobium*) *casuarinae* seems similarly to be a variation of the Australian *D. racemosum.*

More convincing "old" immigrants comprise a fifth *Dendrobium* section characteristic of New Caledonia: the near-endemic *Eleutheroglossum* (4 species, 1 with 2 varieties; 1 species endemic to Australia). Vegetatively reduced, with few leaves and short multi-internode pseudobulbs, this group resembles Australian section *Dendrocoryne,* but is notably distinguished by a lip with bifid midlobe, unusual in the genus.

The only Australian species in section *Eleutheroglossum, D. fellowsii,* appears, vegetatively, relatively primitive. It has an elongated stem carrying several leaves and resembles the New Caledonian *D. poissonianum.* Thus this section could have originated on land now submerged, diffused both directions, and become divided by the waters. Later aerial travel westward from New Caledonia to Australia seems less likely for two reasons: it would be against the current of the prevailing eastward migration, and island species seldom colonize continents. (Relatively recent movement of dendrobiums from New Guinea to Cape York in Australia is only a technical exception: the plants actually spread from a larger to a smaller suitable land area.)

Ben Wallace (pers. comm. 1999) points to a parallel example in *Sarcochilus,* Australian *S. weinthalii,* whose closest relative (*Sarcochilus koghiensis*) is in New Caledonia. He also notes that summer cyclones commonly approach Queensland from the east. *Dendrobium fellowsii,* notoriously hard to cultivate, evidently has adapted to a low-altitude forest niche. Another possibility is that section *Eleutheroglossum* (and a subgroup of *Sarcochilus*) originated in Australia, migrated to New Caledonia, and radiated there while only one species of each survived the climatic upheavals on the continent. The present Chesterfield Reefs, as noted above, suggest past "stepping stones" across the Tasman Sea.

Late immigrants

Two of the three New Caledonian species in the distinctive, pseudobulbless section *Rhizobium* probably arrived relatively recently from Australia, since they do not occur elsewhere in Oceania. *Dendrobium linguiforme,* a familiar Australian species, if correctly recorded for New Caledonia, has not been found there for over a century. *D. chalandei* is now considered synonymous with Australian *D. bowmanii* despite small differences. A third taxon, *D. casuarinae,* with slim leaves and inflorescences reaching upwards, resembles the Australian *D. racemosum.* The fourth species, pendulous *D. vagans,* occurs on neighbouring Pacific islands. It closely resembles *D. flagellum* of New Guinea as well as its nearest Australian relatives, members of the *D. teretifolium* complex. Its prevalence in the Melanesian island chain, however, indicates that it probably belongs with the next group of late immigrants, those of New Guinea origin. *D. vagans is* erroneously called *D. sylvanum* in Hallé (1977) and Bégaud et al (1995).

Less than 15 mya another cohort of *Dendrobium* species began to arrive in New Caledonia from New Guinea via a new "bridge," the volcanic island chain of the Solomons and Vanuatu. Six sections in this wave have only 1, and 3 have 2, species in New Caledonia. This is an island phenomenon: the first species to establish itself presumably dilutes out, by hybridisation, closely related subsequent immigrants. Few endemics are in this group. All these immigrants are epiphytic, and, except for *D.* (*Brevisaccata*) *finetianum,* they have not colonized the ultramafic areas.

D. austrocaledonicum is the sole representative of Asian/Sundan section *Distichophyllum* in Oceania. This section has radiated remarkably in Borneo but nearly stopped at Wallace's Line: it has only three New Guinea representatives. Though named after New Caledonia, it occurs as far up the island chain as Bougainville and may be conspecific with *D. xanthophaeum* of New Guinea.

Another member of the northern clade, which developed in Sundaland (Malaysia/Indonesia), is *D. platygastrium* (syn. *D. camptocentrum),* with flattened pseudobulbs. It is in the small Section *Platycaulon*; probably synonymous taxa live in New Guinea and on several Pacific Islands. *D. platygastrium* is generally self-pollinating, a characteristic which must have facilitated its spread to new islands, blocked speciation, and impeded taxonomic study.

Other late immigrants via the island chain represent sections in the southern clade, which evolved in Sahulland (Australia, New Guinea, and their shared, now submerged coastal plain) and now centre in New Guinea. As with the preceding northern group, each section has only one or two representatives in New Caledonia. In noting possible relatives of *Dendrobium* section *Macrocladium*, I have discussed *D.* (*Brevisaccata*) *finetianum.* It must be a late immigrant because it resembles species in New Guinea and Fiji much more closely than its atypical Australian relative, *D. agrostophyllum.* I have also mentioned above the apparently New Guinea-derived, rather widespread *D.* (*Rhizobium*) *vagans.*

Two endemic *Dendrobium* species, *D. camaridiorum* and *D. crassifolium*, are in New Guinean section *Grastidium.* This group seems to mutate readily: it produces endemic species nearly everywhere it goes. (We must remember that its ephemeral flowers, which preserve poorly, tend to baffle taxonomists.) Other southern-clade species from New Guinean sections are 2 in *Spatulata, D. conanthum* and *D. macranthum*; *D.* (*Latouria*) *macrophyllum*; *D.* (*Biloba*, syn. *Monanthos*) *bilobum*; and *D.* (*Oxyglossum*) *masarangense*, all found on multiple islands. Among the Sahullan segregate genera, *Diplocaulobium ou-hinnae* and *Flickingeria comata* are the only species in New Caledonia. The former, named after a New Caledonian town, also appears in Vanuatu. As we have seen, the species in the above sections run the gamut from endemic to widespread.

From their ranges, we can see that the recent immigrants arrived from New Guinea by island-hopping, which has been possible for only about 15 my. The closest and most obvious source island is Vanuatu: of its 30 species in the Dendrobiinae (Lewis and Cribb 1989), 9 occur in New Caledonia. One of these, *D.* (*Dendrocoryne*) *comptonii*, is basically Australian, however, and probably migrated the other direction, from New Caledonia to Vanuatu. Of the remaining 8 species, 6 have been found farther up the island chain in the Solomons (Lewis and Cribb 1991).

Over time, new species arrive on an island and others become extinct. Australian *Dendrobium* (*Rhizobium*) *linguiforme,* if it really lived in New Caledonia (two locations reported), has not been seen there since about 1860 (MacKee pers. comm. 1994).

D. masarangense, the only widespread member of a "young" New Guinea section, *Oxyglossum,* found in New Caledonia in 1985, survives in a single location. Intensive searching failed to find it elsewhere (MacKee pers. comm. 1994). Could the former species be departing and the latter arriving? Perhaps both are recent colonists, and *D. linguiforme,* otherwise endemic to Australia, failed to take hold.

(To be concluded next issue)

The Genus *Dendrobium* - Are there Problems?

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The genus *Dendrobium* (in the broad sense) belongs to the subtribe *Dendrobiinae* which is found from the Himalayas in the west, to Polynesia in the east, north as far as Japan and the tip of Korea and down to south-eastern Australia. Dressler (1992) included the genera *Dendrobium, Cadetia, Flickingeria, Epigeneium, Diplocaulobium* and *Pseuderia* in the subtribe.

However, more recent work (Yukawa et al. 1996) has shown that *Pseuderia* belongs elsewhere; in the tribe *Podochileae* and that the genus *Epigeneium* is the sister group to the rest of the *Dendrobiinae.* By far the largest genus is *Dendrobium* with more than 1200 species. Schlechter in *The Orchidaceae of German New Guinea*, after criticizing Kraentzlin's treatise on dendrobiums, admits that the task of determining species was difficult, and proposed 41 sections! Since then the number of sections have been reduced, with several of Schlechter's sections now being generally treated as genera.

It is interesting to see that Schlechter regarded section *Rhizobium* (now the genus *Dockrillia*) as a typical Papuan-Australian section and he further divides it into two; being those with flagellate terete leaves and those with broader, oval or oblong, thick, fleshy or leathery leaves. The Australian section "*Dendrocoryne*", which include *Dendrobium kingianum, D. tetragonum, D. gracilicaule* etc. he says is similar in habit to certain section *Latouria* species, from which they are only distinguished by the simpler labellum shape.

Botanists more familiar with the dendrobiums of India, Burma and Thailand, plus orchid fanciers with 'soft cane' and 'hard cane' species have suggested how the typical Australian section could have arisen. Brieger (1981) in *Die Orchideen*, suggested that the subtribe evolved in Gondwanaland in the Cretaceous, when Africa and North America were not yet separated. As the super continent split, part of the subtribe went to India, and then north as India separated from Gondwanaland, and another section went southward to Australia. Dr. Howard Wood gave a fuller explanation in *The Orchadian* of December 1998.

Phillip Cribb in a paper "The Genus *Dendrobium* in New Guinea, Australia and the Pacific Islands" came to the conclusion that the genus *Dendrobium* evolved in the Pacific and that there were three waves of immigration to Australia. The first involved species resembling those of Java and Sumatra e.g. the section "*Dendrocoryne*", the second in wetter times the section *Grastidium* e.g. *D. baileyi* and the third, the terete leaved species such as *D. teretifolium* in dryer times.

Then in 1998, at the Monocot.11 Conference in Sydney, Tomahisa Yukawa gave a paper entitled "DNA Phylogeny and Morphological Diversification of Australian *Dendrobium* (Orchidaceae)" of which he has since sent me a copy (Yukawa et al. in press). This was a report on the phylogenetic analysis of a small sample study of *Dendrobiinae* - 32 species of *Dendrobium*, one of *Cadetia*, two species of *Diplocaulobium*, one species of *Flickingeria*, and two species of *Epigeneium.* Of the *Dendrobium* species sampled Clements and Jones, have transferred five to *Dockrillia*, and one to *Grastidium*. Yukawa et al. sequenced the chloroplast gene matK from this sample of species, aligned the sequences and analysed them to produce a phylogenetic tree. This tree shows the most likely evolutionary genealogy relating the species that were sampled. Yukawa et al. came to the conclusion that the genus *Dendrobium* was not monophyletic i.e. not derived from a single ancestral stock but includes the genera *Flickingeria, Diplocaulobium* and *Cadetia* as subgroups. They showed that *Dendrobium* in the broad sense (i.e. including *Flickingeria, Diplocaulobium* and *Cadetia*) consists of two major clades or natural phylogenetic lines. and that there were two major clades or natural polyphyletic lines. One clade contains all those species that are endemic in Australia and the second, is almost completely absent from Australia except for some species in North Queensland (e.g. *D. smillieae, D. stuartii*).

Yukawa et al. then looked at the geographical distribution of the subtribe *Dendrobiinae* and saw that the distribution of the genus *Epigeneium* is limited to montane forests of the

Himalayas, Indochina, Taiwan, Sumatra, Java, Borneo and the Philippines. The rest of the subtribe, comprising *Dendrobium* (clades 1 and 2), is distributed widely over the Asia- Pacific region.

This pattern they suggested needed more comprehensive biogeographical analyses after phylogenetic relationships of the *Dendrobiinae* subtribe are fully explained, and go on to state "The present result, however, indicates to us that the *Dendrobiinae* migrated eastwards in general, and the idea of a Gondwanaland origin of this group (e.g. Brieger 1981) is less plausible".

Finally Yukawa et al discuss the origins of the Australian *Dendrobiineae*, and conclude that "they have a multiple origin, but the exact number cannot be counted. It is likely that there are two different patterns of dispersal. In the case of *Dendrobium* Sections *Australorchis* (*D. monophyllum* and *D. schneiderae*), "*Dendrocoryne*", *Lichenastrum*, and *Rhizobium* do not have a shared, single origin". They assume that they are earlier migrants to Australia and may be isolated relicts of clade 1. Those species also found in New Guinea must have been more recent dispersals to Australia.

The difference between the molecular and morphological divergences in the *Lichenastrum* and *Rhizobium* clade they suggest, is due to adaptive radiation. "This clade diversified within a relatively short period of time on the east coast of Australia, and except for the subclade represented by *D. teretifolium*, each subclade comprises one or a few species. Many anatomical and morphological characters of this clade show xeromorphic features suggesting divergence of habit was caused by climate drying during the Pliocene and Pleistocene in eastern Australia". The appearance of terete-leaved dendrobiums in New Caledonia, Vanuatu, Polynesia is not discussed but shows the eastward migration of orchids discussed in Cribb's paper. There are no terete-leaved dendrobiums (*Dockrillia*) west of Wallace's Line (a line which separates the Indonesian islands of Sulawesi and Borneo, slightly west of the edge of the Australian tectonic plate).

Further botanical work on the genus *Dendrobium*, particularly in New Guinea, which has the greatest number of the species, is likely to see many new genera recognised. Schlechter, I think, would not be surprised. As for the evolution of the subtribe *Dendrobiinae*, this also calls for more work by botanists, geologists and biogeographers before there can be general agreement.

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AUSTRALIAN ORCHID RESEARCH

is an occasional publication dealing with the results of scientific research into Australian Orchidaceae. It is published periodically when suitable material comes to hand. All publications are reviewed by at least two botanical specialists and edited prior to publication.

AUSTRALIAN ORCHID RESEARCH
VOLUME 3, 1998
Contributions to Tasmanian Orchidology 1-9
AUSTRALIAN ORCHID FOUNDATION

Three volumes have been published to date:-

Volume 1, 1989.,
Catalogue of Australian Orchidaceae, M.A. Clements.

Volume 2, 1991.,
New Taxa of Australian Orchidaceae, David L. Jones.

Volume 3. 1998.,
Contributions to Tasmanian Orchidology, David L. Jones.

Copies of
AUSTRALIAN ORCHID RESEARCH
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**The Australian Orchid Foundation,
107 Roberts Street, Essendon 3040
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Book Review:
Dendrobium and its Relatives
by Bill Lavarack, Wayne Harris and Geoff Stocker

288 pages, 215mm x 285mm, hard cover, ISBN 0 86417 974 X, Published by Kangaroo Press (an imprint of Simon & Schuster Australia Pty Ltd. RRP AUD$69.95

Dendrobium and *Bulbophyllum* are the two orchid genera, which I like the most. The reason for this is because of the wide range of variation within the plants, flowers, the kaleidoscope of colours available and many of the species are quite easy to grow and bloom. Sadly the genus *Bulbophyllum* is not as popular as it should be, and sadly it will be a long time before we see a similar treatment for this group of orchids. So, it is always with great excitement that I await the release of a new book on orchids, particularly if the orchids discussed are species, and even more so if the book is about dendrobiums and related genera.

This book is divided into two parts:
Part One that has 8 chapters: -

1. Introduction
2. Classification and Nomenclature – explains why name tags, at times, have to be changed.
3. Distribution and Origins – some thought provoking items in this chapter.
4. Traditional Uses – a most intriguing chapter.
5. Conservation – very important topics discussed in this chapter.
6. Biology and Ecology - most interesting.
7. Cultivation – lots of useful tips here
8. Artificial Hybrids – the only chapter I didn't read because I have absolutely no interest in hybrids.

and Part Two which is The Dendrobiinae.

In Part 2, each discussed species (there are 413 taxa included), is accompanied by a photograph, usually of excellent quality. It is a pity though, that some of the species, have been illustrated by a photograph of the plant only e.g. *Dendrobium pseudocalceolum*, *Dendrobium guangxiense* (this plant is in flower but it would be impossible to identify a plant from the photograph), *Flickingeria bancana*, *Grastidium peekelii*, *Grastidium salaccense*, *Dendrobium vexillarius*, *Dendrobium puberlingue* and *Dendrobium truncatum* - which is not of much use if you wish to try and identify a flower.

There are also, sadly, a number of mis-identifications (an extra set of eyes may have been handy here) and some commonly used names have recently been reduced to synonymy. *Dendrobium gonzalesii* is now *D. ceraula* – an earlier name. *Dendrobium epidendropsis* is placed in the synonymy of *D. ionopus* – also an earlier name. The species illustrated on page 29 as *D. anosmum* is *D. parishii*. *Dendrobium lobulatum* (page 109) is the same picture (although sideways) as *D. keithii* (page 108). *D. keithii* is the picture for both species. *Dendrobium guerreroi* (page 123) is without a doubt *D. ionopus* - (*D. guerreroi* has an obovate labellum and the flower is an off-white to cream in colour). The plant identified as *D. montanum* (page 124) is *D. crumenatum*. *Dendrobium farmeri* is illustrated twice, correctly on page 128 and also as *D. palpebrae* on page 129. *D. palpebrae* is only known from a few collections, none of which have been in the last 2 centuries. Only published picture is in Curtis' Botanical Magazine t. 8683, which was reprinted in Sprunger (ed.) *Orchids from Curtis' Botanical Magazine*. The species identified as *D. victoriae-reginae* (page 126) is hybrid of *D. goldschmidtianum* and *D. victoriae-reginae*. *Diplocaulobium tropidophorum* on page 170 is really *Diplo. dichotropis*. The plant identified as *D. schuetzei* (page 196) is *D. dearei*. The mid lobe of the labellum of *D. schuetzei* is like an inverted heart to circular. There is an excellent line drawing of the labellum of *D. schuetzei* in *Dendrobiums, an introduction to the species in cultivation* by Schelpe and Stewart on page 12.

A number of plants have been placed in wrong sections (this is a personal opinion and sections are the subject for some conjecture) – *Dendrobium auriculatum* and *Dendrobium papilio* are members of the section *Dolichocentrum*. *Dendrobium dixanthum*, *D. fimbriatum*, *D. gibsonii*, *D. moschatum* and *D. pulchellum* are members of the section *Holochrysa* Lindl.

Apart from the mistakes noted above this is a fine book and is worthy of a place in the collection of any serious species growers library and is a must have for orchid society libraries. I am certain there are plenty of species illustrated that you have never seen before and the book is worthwhile for this reason alone. A fine effort, from three knowledgeable growers, and more importantly writers.

Jim Cootes
Email: jecootes@ozemail.com.au

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CD-Rom Review: *Pictorial Guide to the Wild Orchids of Victoria*

by Jeffrey Jeanes and Gary Backhouse.

Published by Zoonetics ERBooks. PO Box 124. Seaford Victoria 3198 Australia, Phone (03) 9766 4074, fax (03) 9766 4094. Price: In Australia (incl. New Zealand and PNG) AUD$66 per copy including GST, postage and handling. Overseas US$50 per copy including postage and handling.
Email rudie.kuiter@zoonetics.com

This is an Electronic Reference Book, in CD-ROM format, covering all of the almost 330 species, subspecies and varieties of wild orchids occurring in Victoria. Flowers, whole plants, leaves, variations and many naturally-occurring hybrids are presented in 1300 superb photographs. The guide incorporates the latest taxonomic changes, and features many yet to be named species. Information is presented in an easy to use format, with genera and species arranged so that closely related or similar orchids are grouped together for ease of identification. Each genus has a brief introduction, including distribution, number of species and information on natural history. Species information includes scientific and common names, a brief description highlighting key identification features, distribution, habitat and flowering time. Photographs are captioned with orchid name and locality. The guide includes a glossary, bibliography section, checklist of Victoria's orchids, summary of recent taxonomic changes and index. The CD comes complete with operating software for both PC and Mac computers, and can be run using 'Windows 95' or later versions. I found this CD very easy to use, and there are a number of "hot links" to take you to various parts of the text. Most books only show one example of a species or hybrid, yet here we see numerous variations within the taxa, including albino and peloric forms. It is an essential reference for those interested in Australian orchids, particularly the terrestrials, and of broad interest to lovers of species orchids.

DPB

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Growing the Beech Orchid - *Dendrobium falcorostrum*

David Butler
21 Greenvale Grove, Hornsby, NSW 2077
E-mail: ejbutler@ozemail.com.au

Dendrobium falcorostrum is a native of ancient Australian beech forests, remnants of which are located sporadically along the higher parts of the Great Dividing Range in Northern New South Wales and Southern Queensland. Usually found above 1000 metres elevation, these forests are often shrouded in heavy mist and may be subjected to infrequent winter dustings of light snow.

Hardly the place to go looking for native Australian dendrobiums, but it is here exclusively in these cool, exposed places that we find one of the showiest of them all. In fact, this orchid seems quite dependent on the Antarctic Beech (*Nothofagus moorei*), for survival even though it is occasionally found growing on other hosts.

Fortunately most of the remaining stands of beech trees are being preserved, thus hopefully ensuring the survival of *D. falcorostrum* in nature. The word 'hopefully' is relevant because this is one of the most sought after and beautiful indigenous Australian orchids. Its many attractions include a dazzling floral display of heavily perfumed pristine white flowers, neat compact growth habit, and relative ease of culture.

Considering the isolated nature of the various colonies of *D. falcorostrum* the flowers throughout its range are remarkably similar. As with most orchids some variation does occur, the sought after plants being those that flower prolifically year after year and have larger flowers of heavy texture which open flat. One thing they all have in common is the strong but pleasant perfume most noticeable on warm mornings, a trait that is frequently passed on to its hybrids.

A valuable orchid in hybridising, *D. falcorostrum* crosses readily when used as the pollen parent but is itself reluctant to form seed capsules. Although it has only a white colour to contribute in hybridising, it is surprising how often it draws out unusual colours from the other parent. Investigation will sometimes show that these colours are coming from a generation or two back on the pod parent's side.

The normal culture of *D. falcorostrum* consists of potting in a bark/pebble mixture or mounting the plant on the side of a piece of tree fern. Both these methods usually give good results provided, in the case of potted plants, that the mix remains open and free draining. For those growers seeking greater cultural success it may be worth trying a minor variation of the mounted method, which has proved most successful.

Some years ago, I was given a plant of *D. falcorostrum* on the proviso that it be mounted on top of a flat rock or piece of tree fern and hung from the bushhouse roof. The first option lacked appeal on several grounds and anyway, the latter seemed much easier to accomplish. The plant was duly placed in a small depression in the top of a tree-fern log, securely tied on with stocking, and the log then suspended some 600mm below 50% shade-cloth with some additional shade in summer.

From that point on the effect was not much short of amazing. Roots grew rapidly and penetrated into the hard, tightly compacted fern fibres and the small cluster of pseudobulbs doubled in number. This doubling process continued each year until the plant was gaining some fifty new growths annually. Root growth also was rampant but all roots were confined within the log. The extent of this root growth was only revealed when the plant was finally removed and broken up, as no roots were ever visible on the exterior of the fern mount. They did not even come to the surface and go back in again.

Since then, other plants of *D. falcorostrum* have grown well on horizontal tree-fern mounts, although it must be admitted that the occasional plant did not take readily to the fern and preferred pot culture. This is the method now favoured by the author, the sought after result being a large evenly grown specimen covered all over with lovely wide-open scented white flowers. My plant of *D. falcorostrum* 'Fran' CC/ANOS reproduces this eye-catching floral display each year.

The best way to understand the cultural requirements of a species orchid is to refer to its natural habitat and host, which in the case of *D. falcorostrum* is quite specific. The Antarctic beech tree thrives in the cool, moist mountaintops where fresh moving air abounds. The thick spongy bark is always damp, the robust trunk and substantial horizontal limbs being the favoured home of *D. falcorostrum.*

It is this liking of moisture that probably accounts for horizontal tree fern mounts being a suitable substitute host, as these drain well yet remain damp for long periods. A very small amount of wetting agent added to the initial watering will assist if the mount is drying out too quickly, but overdoing this will render the mount ineffective. The orchid has grown well on both soft and hard tree fern; logs of some 250mm diameter and 450mm long seeming fine provided they have a thick cover of fern root fibre. These logs may be cut in half longitudinally to lighten the weight and to give a flat underside, an advantage during transport and when exhibiting at orchid shows.

The orchid seems also to relish the company of the rock felt fern (*Pyrrosia rupestris*) or similar fern species. Ferns such as hares foot and birdsnest, which can 'take over', should be weeded out. A growth of moss on the mount does not appear detrimental, nor has it been deemed necessary to correct acidity even after several years.

The more exposed to light the better the flowering, but you must keep the plants cool. Should your conditions suit and protection be given from hot westerly winds you too may find this lovely orchid a delight to grow.

✿

Ira Butler Awards for 2000

Roslyn Capell
Hon. Secretary, Ira Butler Trophy Committee
P.O. Box 899, Willoughby, NSW, 2068

THE WINNER OF THE GOLD IRA BUTLER TROPHY - 2000

for The Champion Australian Native Orchid Hybrid of the Year is

Dendrobium Glitter 'The Star'

This splendid orchid was Champion Australian Native Orchid Hybrid at the Far North Coast ANOS Group show. It is a hybrid between *Dendrobium* Jesmond Glitter and *D.* Zip It was a very floriferous plant with up to twelve beautifully presented flowers to an inflorescence. The Show Marshall described the flowers as having pink mottled edges on a cream background, with a darker mottled labellum to match the rest of the flower. The plant is owned by Kay and Norm Mitchell of Bellingen and was bred by John Purvis. It comprises 47% *Dendrobium kingianum,* 22% *D. speciosum,* 19% *D. tetragonum,* and 12% *D. fleckeri.*

Of the 34 nominations this year, 9 were from ANOS groups, 1 from NOSSA, 18 from State or OSCOV Affiliated Societies, 5 from State Societies, and 1 from Ken Russell's Dungog Show. Nominated plants had also received a total of 9 quality awards during the year and three Awards of Distinction. The overwhelming majority of entries were dendrobiums, and there were only two terrestrials.

The following ten "runners up" will receive **Silver Ira Butler Trophies:**

- *Dendrobium* (Aussie Victory x Warrior) - Lloyd Perryman
- *Dendrobium* (Tie-Dye x Hilda Poxon) - Norm & Kay Mitchell
- *Dendrobium* Avril's Gold 'Pure Gold' - David Butler
- *Dendrobium* Avril's Gold 'Ray' - Henk van den Berg
- *Dendrobium* Elegant Heart 'Corella'- Bruce Mules
- *Dendrobium* Essie Banks 'Showers of Gold'- Mrs Nessie Follett
- *Dendrobium* Kayla - Phil Barrett
- *Dendrobium* Tawhai 'Beattie' - B. & B. Khann
- *Dendrobium* Tie-Dye 'Genesis' - Down Under Native Orchids
- *Dendrobium* Warringah 'Candy' - Henk van den Berg

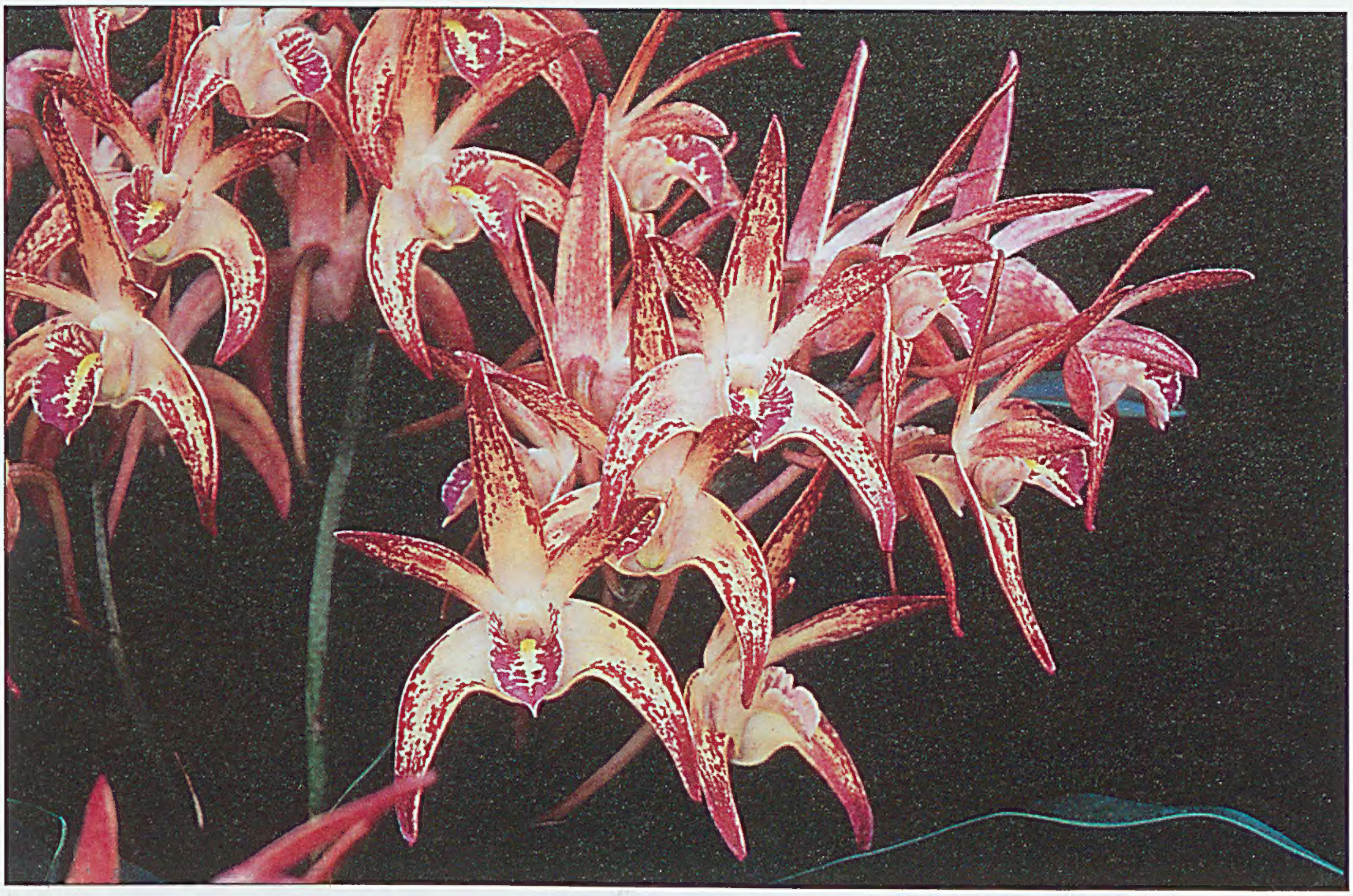
THE WINNER OF THE BILL MURDOCH TROPHY - 2000

for The Champion Australian Native Orchid Species of the Year is

Caladenia sp. aff. *filamentosa*

This exceptional entry was grown by Les Nesbitt, and was Champion Australian Native Orchid Species at the NOSSA Spring Show. The nomination form discloses that the 175mm pot contained 25 stems of fully open flowers of superior form and colour with all plants in excellent condition. (Editor's Note; discussions with David Jones suggests this taxon may be *C. denticulata* from Western Australia)

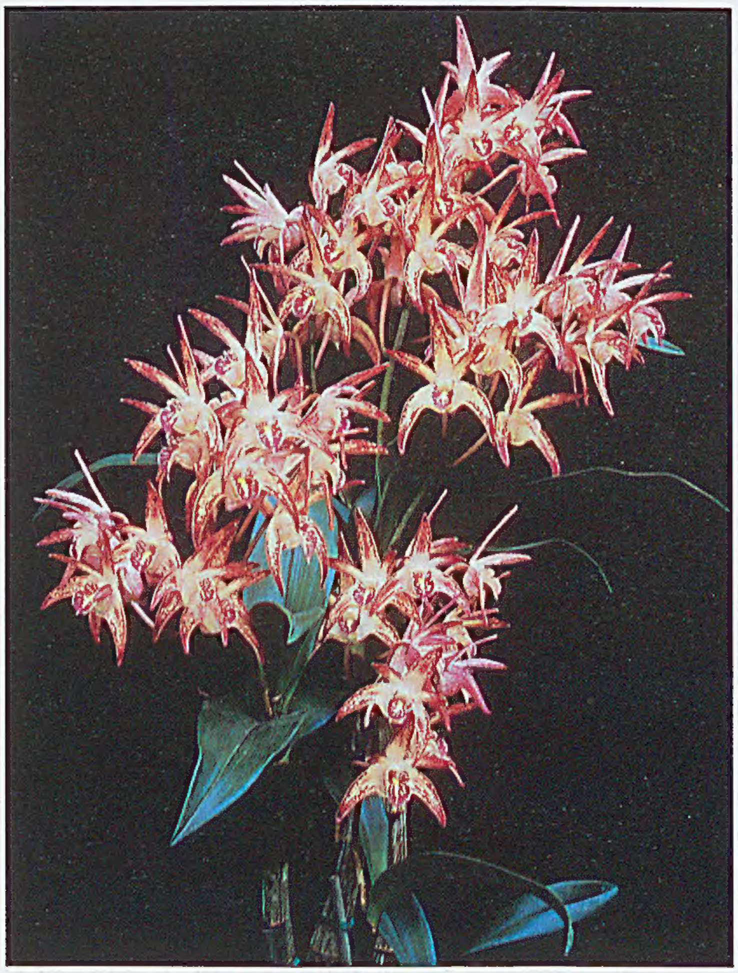
This year the Committee awarded its first **Bill Murdoch Certificate of Special Recognition.** The recipient was a fine plant of ***Dendrobium speciosum* subsp. *curvicaule*** owned by B.H. Burnham. It was Champion Australian Native Orchid at the Alstonville Orchid Society Spring Show, aptly described on its nomination form as being a beautiful display of well-shaped flowers on a long inflorescence.



Growers, Norm & Kay Mitchell N. Mitchell

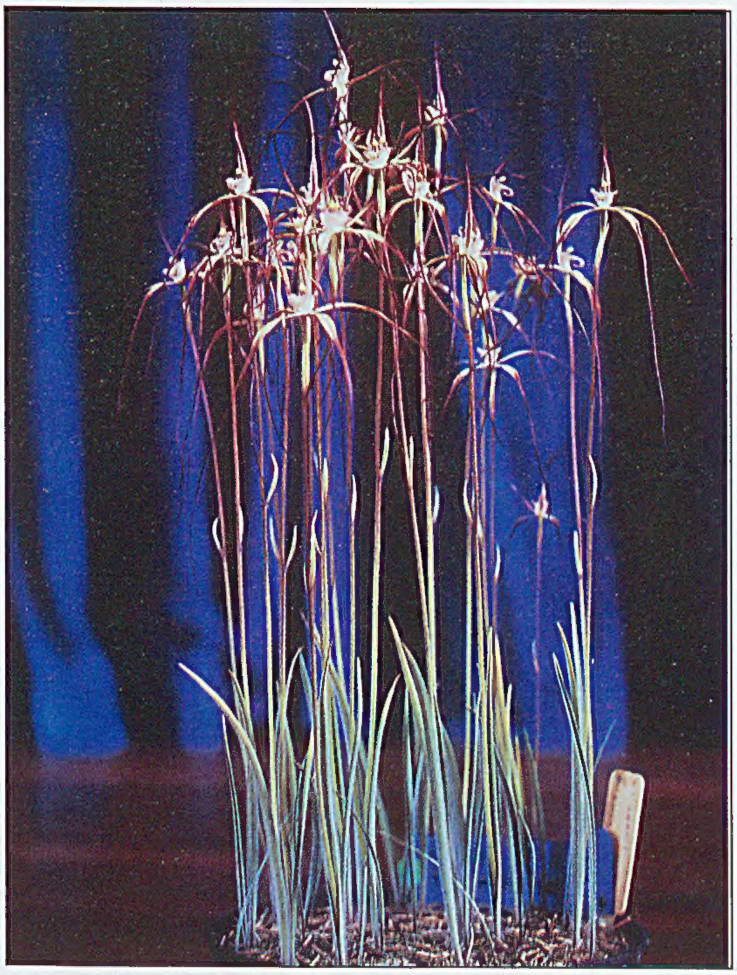
Dendrobium **Glitter 'The Star'**

Gold Ira Butler Trophy Winner - 2000



Growers, Norm & Kay Mitchell N. Mitchell

Dendrobium **Glitter 'The Star'**



Grower, Les Nesbit R. Biddell

Caladenia **sp. aff.** ***filamentosa*** **(?)**

Bill Murdoch Trophy Winner - 2000

There were 23 nominations this year, of which 7 were known to be line bred, and nominated plants had also received a total of 5 quality awards during the year. Nine nominations were from ANOS groups, 1 from NOSSA, 3 from State Societies, and 10 from State or OSCOV affiliated societies. There was a fair range of genera represented, although again more dendrobiums than any other genus.

The Ira Butler Trophy Committee

The Ira Butler Trophy Committee consists of eight persons: the Chairman - a senior judge elected by the Committee (currently Murray Corrigan), three judges nominated by ANOS (presently Michael Harrison, Jim Lykos & Bruce Murray), three judges nominated by the Orchid Society of New South Wales (presently David Banks, John Carter & Gordon Hansen), and an Honorary Secretary.

The Ira Butler Trophy Judging

Most orchid society members have some idea of how orchid judges carry out their task. They have seen them judging the plants benched at their own club's monthly meetings and annual shows and sometimes have even witnessed the judging at the larger regional shows which can require several panels of judges to perform the task at hand.

However the Ira Butler Judging is something of a mystery to most growers, and the Committee considered it appropriate to provide some information about how the judging takes place. The very nature of the Ira Butler Trophy Competition requires that the entries are, by necessity, judged on the slides and floral details submitted with the nominations. This is so that all plants satisfying the eligibility criteria at any time during the relevant year, and from any part of Australia, can be considered.

It has been said that the Ira Butler judging amounts to a photographic competition. While it is indeed a competition determined by an assessment made upon what is revealed on the slides' it is a determination based upon the quality of what is revealed, and not the quality of the slides. An inferior orchid photographed expertly remains an inferior orchid.

The six judges on the Ira Butler Committee - three nominated by ANOS and three nominated by the Orchid Society of New South Wales - must be senior qualified judges of the respective Societies. The judges are well aware of the extra challenge this system presents and take great care to assess each entry on its merits and according to the relevant judging standards and guidelines. However it goes without saying that poor photography does not assist the plant. Growers and show marshals are urged to bear this in mind when arranging for the plants to be photographed for the competition. It is also asked that, wherever possible, plants be photographed without embellishments or identifying labels.

Nominations are required to be accompanied by three slides: one showing the whole plant, one showing the front view of a flower, and one inflorescence showing some flowers in profile, to enable the judges to see and assess all relevant features of the plant.

The only information about the plant that is available to the judges while they are viewing the slides and carrying out the judging process is a numbered list of the nominations stating the name of each plant. They do not know the name of the owner or the show or even the state from which the entry was received. The three slides of all of the entries are shown to the judges, and after seeing all slides once the panel views them again and begins the critical evaluation process which ultimately results in a winner in each category. They also may, at any time, call on the Honorary Secretary to read measurements and other floral details from the nomination form.

It is only after the judging has been completed and the winners determined that the judges learn the identity of the owners of the winning plants.

Hopefully these few words have been of some assistance to those who are interested in how the Ira Butler Trophy judging is carried out. Congratulations to all participants in the 2000 awards, and good growing in 2001.

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DIRECTORY OF A.N.O.S. GROUPS (& Associated Societies)

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- **ANOS Central Coast**, P.O. Box 3010 Erina 2250. ☎(02) 4328-5667. Meetings 8pm, 2nd Wed. each month. Temple Kiely Visitors Centre, Department of Agriculture Station, Research Rd., Narara.
- **ANOS Far North Coast**, P.O. Box 949 Ballina 2478. ☎(02) 6686-6303. Meetings 7.30pm, 3rd Fri. each month. C.W.A. Room, River Street, Ballina.
- **ANOS Illawarra**, 2 Wilford St., Corrimal 2518 ☎(02) 4284-8308. Meetings 7pm, 2nd Tue. each month. Legacy House, Market St., Wollongong.
- **ANOS Macarthur & District**, 28 Crispsparkle Dr., Ambarvale 2560. ☎(02) 9727-4491. Meetings 8pm, 3rd Wed. each month. Narellan Community Hall, Queen St., Narellan.
- **ANOS Mid-North Coast**, P.O. Box 128 Taree 2430. ☎(02) 6553-1012. Meetings 7.30pm, last Fri. each month. (Held at Taree or Wauchope - telephone Secretary for details).
- **ANOS Newcastle**, P.O. Box 273 Kotara Fair 2289. ☎(02) 4942-1362. Meetings 7.30pm, 4th Tues. each month. Warners Bay Community Hall, Crn John & Lake Sts., Warners Bay.
- **ANOS Port Hacking**, P.O. Box 359 Gymea 2227. ☎(02) 9524-9996. Meetings 8pm, 4th Wed. each month. Presbyterian Church Hall, 391/393 Port Hacking Rd. Sth., Caringbah.
- **ANOS Sydney**, 4 Regal Ave., Kings Langley 2147. ☎(02) 9624-1768. Meetings 8pm, 3rd Fri. each month. Senior Citizens Hall, Baulkham Hills Community Centre (off Conie Ave.) Baulkham Hills.
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QUEENSLAND

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VICTORIA

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- **Native Orchid Society of South Australia**, P.O. Box 565 Unley 5061. ☎(08) 8356-7356. Meetings 8pm, 4th Tue. each month. St. Matthews Hall, 67 Bridge St., Kensington.

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- **ANOS Western Australia**, 95A Ewen St., Scarborough 6019. ☎(08) 9341-6709. Meetings 8pm, 2nd Mon. each month. Wilson Community Hall, Brailbrise Rd., Wilson.

NEW ZEALAND

- **ANOS New Zealand**, 20 Fairlands Ave., Waterview, Auckland, New Zealand.
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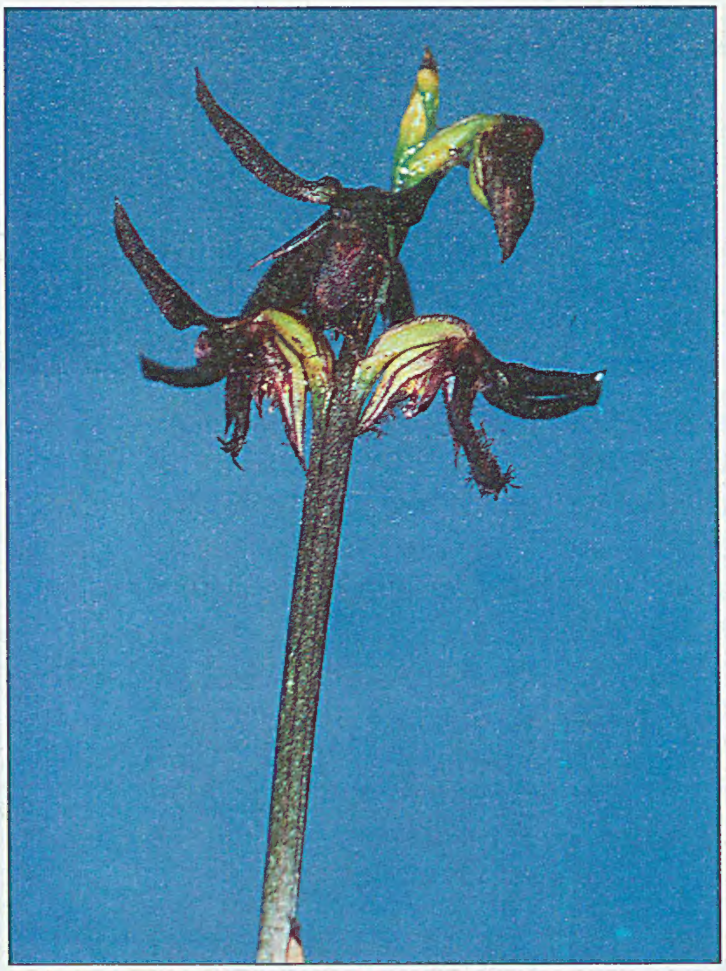
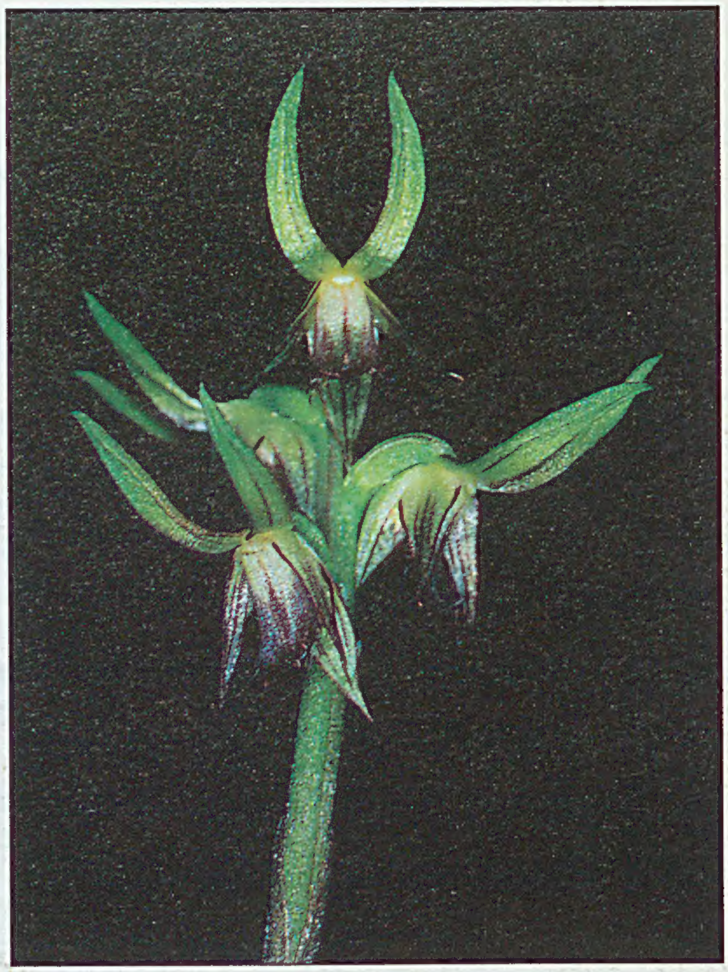


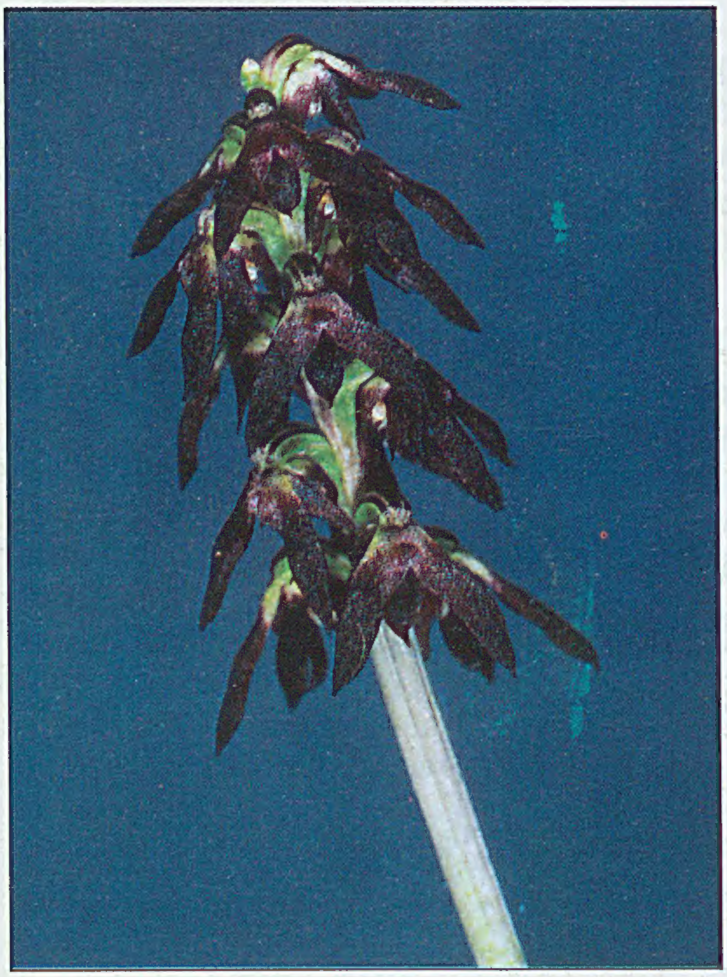
M.A. Clements

Genoplesium oliganthum
from near Braidwood, New South Wales



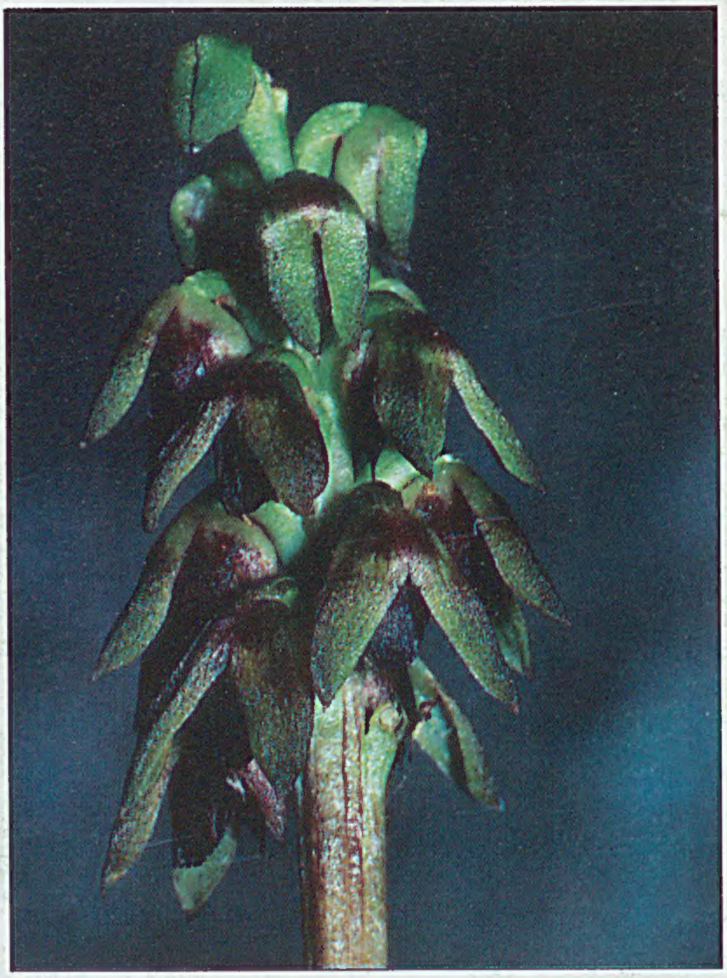
M.A. Clements

Genoplesium ostrinum
from near Molonglo, New South Wales



M.A. Clements

Genoplesium vernalis
from East Lynne, New South Wales



M.A. Clements

Genoplesium vernalis
from East Lynne, New South Wales

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